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Bob Cooper's

APRIL 15 1998

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

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DTH MDUs- Serving Multiple Dwelling Units

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☐ ***Satellite Installations:*** *a step-by-step guide to how to install DTH TV receiving systems from locating the site & selecting the components to assembly, tracking and maintenance. Includes information on how to tune digital IRDs and troubleshoot problems with digital TV receiving systems.*

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MONTHLY

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This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

Editor/Publisher
Robert B. Cooper (ZL4AAA)
Office Manager
Gay V. Cooper (ZL1GG)

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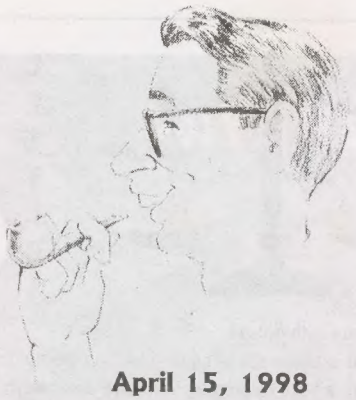
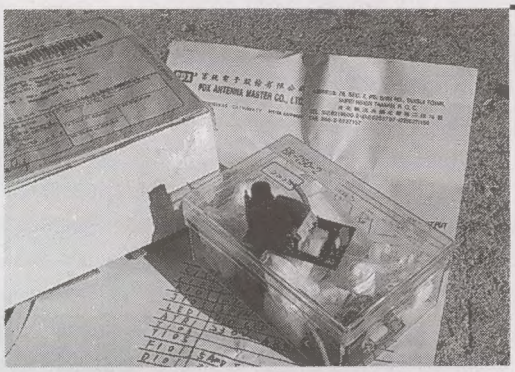
COOP'S COMMENT



April 15, 1998

It was a warm, dry and clear late summer Sunday afternoon; not the sort of day one would anticipate a major cable TV system fault. The most common faults in our buried cable TV system are caused by human beings, digging in the ground and running into our cables. A "trouble call" ('*Our cable TV has been flashing on and off, now it has quit and we were watching something very nice on Discovery*') seemed an isolated incident. Thirty minutes later we discovered to the contrary.



Routinely - 72 hours by air from Taiwan

Far North Cable's PDX (brand) trunk amplifiers are built like armoured vehicles. There are six heavy duty, stainless steel captive bolts that lock the two clam shell halves together and when properly tightened you can drop the amplifier into a container of water and return days, weeks later and it will be totally dry inside. That's what you want because electronic circuits don't do well in moist conditions.

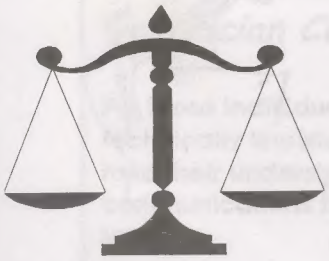
One half of the clam shell holds the AC to DC power supply; the AC side comes through the trunk cable, the DC created from the AC operates the amplifier inside the housing. After quickly determining (a) power to an entire plant section had been cycling on and off, and, (b) then it had quit totally, we began back tracking with a volt meter and signal level meter to locate the last point where we still had service. The problem is usually at or close to such a point.

Our part-time tech, Colin, mentioned to me as he returned from going in one direction while I went in the opposite that he found a power supply inside a clam shell amplifier "*with some of the parts rotted off.*" Parts don't rot off on their own so we went to inspect. Inside, sure enough, a diode, resistor and capacitor were small piles of white powder. The only way this can happen is for the parts to end up under water with electricity flowing through them. And this had happened because Colin, some weeks or months prior when setting the trunk amp line level had neglected to properly tighten up the six clam shell bolts. In a word, moisture crept into the amplifier, formed a small puddle at a low spot and over time percolated into the three component parts sitting at the bottom of the circuit board.

On Monday morning I faxed PDX in Taiwan and asked Peter Lin for help. On Thursday, less than 72 hours later, a 'Speed Air' parcel posted from Taiwan arrived with replacement circuit boards, schematics and component information. If it was the first time Peter Lin has responded to my "urgent" plea for help, I might consider this a fluke. It is not the first, and probably will not be the last. In a world where 'distant suppliers' are a curse, I want to publicly thank PDX for being the kind of company that has routinely supported us with amazing service and great products; most commendable.

-ON THE COVER-

Manuel Gomes (Karratha, WA) during SPRSCS '98 puts the big wrench (plus torque bar) to fine tuning the elevation arm on 3.7m dish at Far North Cable TV. Attempt to use the dish on only vertical of As2, with single pole feed, to improve performance on weak side services, was not successful. Sometimes the failures are as valuable learning tools as the successes.



LETTERS

RAI Unhappy With Optus?

"A small article appearing in Il Globo newspaper (here) with a very large questionnaire dealt with RAI International and Optus Vision. The article suggested RAI was not happy with the financial arrangements they have with Optus Vision and said they are considering utilising a Direct To Home (DTH) policy as well as continuing to make available their programming via Optus. This is of course the RAI feed that carries the real time football (soccer out here) games which are virtually eliminated from RAI on the European Bouquet (As2). The questionnaire asked: 'Do you currently have a satellite dish to view RAI?', 'If you do, would you consider paying a monthly fee to watch the complete RAI?', 'How much would you consider paying for RAI monthly?' I wonder which satellite they are considering (PAS-2, or perhaps Optus B3 where the new Optus Vision DTH testing has been underway)? Does anyone know?"

Pietro Casoar, Digitalsat Communications
Vic, Australia

RAI is tired of getting complaints from Italian-Australians who do not have access to RAI through Optus and pestering Italian authorities for access to Italian 'Futbol'. Optus appears to be considering including this channel in their planned satellite delivery service and the advertising was a way to gauge interest in that service.

RTPi Visiting Australia

"We are pleased to know our service is useful in the Australia / New Zealand region and will be visiting in Australia at the end of April. We would like to meet with people who can assist us in increasing our coverage and the use of our service."

Paulo Jorge, International Manager
Radio Televisao Portuguesa
fax ++351-1-794-7450, Tel ++351-1-794-7498

What Size Dish?

"I have a 3 metre mesh dish with which I catch a few channels; what size should I be using for the best results? Is there any chance to have names and addresses of some or all of the channels showing on satellite at this time?"

George Mirallez, Yeppoon, Qld.

There is an ancient saying - *"It is not how big it is but rather what you do with it."* A 3m dish, if properly assembled, is plenty big for most of what you see listed in SF. More importantly, have you selected a feed that is correct for the dish f/D ratio? Are you equipped for C and Ku and if yes, does C-band suffer with the feed you are using? There are now more digital than analogue programming channels "up there" - do you have digital reception capability?

PROGRAMMER PROGRAMMING PROMOTION UPDATE

APRIL 15, 1998

NBC Asia (including CNBC) believes "*earliest date for encryption of present digital bouquet* (PAS-2, C-band) *will be late 1999 or early in 2000*." That assumes, of course, the Y2K problem doesn't jump up and bite them in the rear end (translation: January 1, 2000 would NOT be a good day to switch to CA!).

NHK's switch to digital. Numbers are Msym 26.470 and 3/4 on 4035/1115 Hz; three programme channels: NHK World NTSC, NHK PAL, NHK Premium are PowerVu, last is CA. Analogue (FTA) has switched to 4060/1090 Vt PAS-2. Early reports said it would be 1/2 transponder; it is not. How long there? Early reports said "until at least June 30" while later reports say, "indefinite but longer than June 30." For FTA channels, NHK recommending Hyundai and Nokia models for reception; for CA, you only have SA D9234 option. NHK Premium reportedly is NOT available on single home (DTH) basis at this time. An additional channel is promised "by October." If you are not comfortable dealing with SA Sydney office for the NHK D9234, hear this. NHK and SA have set up an Asian distribution point within a Filipino duty-free-zone and promise 2 day shipment to any point in Asia (the Pacific). Pricing through the Philippines not available as we go to press, but for assistance in this contact Mr. Katsumi Kuwae at NHK Joho Network (tel ++81-3-3485-7730, fax ++81-3-3485-8677). He is also contact if you want NHK Premium for SMATV or CATV.

RFO with no advance warning switched from Global to East zone beam on Intelsat 701 April 1st. Tahitian reports tell of significant viewer complaints west of new beam coverage (New Caledonia, Fiji, PNG, Australia and others) and the zone beam coverage will be reconsidered when RFO changes from analogue to digital in mid-year. "Unusual" digital service is actually already available; see p. 29.

New Zealand FTA terrestrial TV networks, scheduled at one point to be included in Sky Network's digital bouquet along with new Maori channel, now disclaim they will be there. Source at TVNZ tells SF, "*The matter has become a serious dispute and is being handled between our* (TVNZ) *board and the Sky board.*" TVNZ owns a chunk of Sky, originally believed this would guarantee them this sort of thing would not happen.

Announcement appearing in South China Morning Post (9 March) states, "*AsiaSat believes the total cost of launch and construction of AsiaSat 3S (including insurance cost [for the new launch]) will not exceed the amount of insurance proceeds from AsiaSat 3.*" Company wanted to put to rest rumours that it would suffer financial losses as a result of replacing mis-launched As3. Announcement also said, "(Company) *expects AsiaSat 3S to be launched in the first quarter of 1999, tested and operational 30 days after launch.*" As3S is on "fast track" at Hughes to be ready for delivery to Baiknour (Proton) launch site before end of February (1999) with March (1999) launch - they hope.

NSW TAB has purchased ownership of Sky Racing (Australia) which is distributed internally in Australia as well as internationally on AsiaSat 2. TAB may be planning combination of live racing coverage blended more generalised sport coverage. Debate - should this channel be only available on a subscription basis, or be transmitted FTA? One effect of FTA decision - possible availability to audiences outside of Australia. Channel is talking with several receiver suppliers about 5,000 IRDs for the service.

CNBC shut down Palapa C2 on FTA 3620/1530Hz. For most, service continues on ex-ABN transponder (4040/1110 Hz) but coverage is not nearly as extensive here.

Services Are Available

"A correction to your March issue letter response to Gabriel Chinque (Tahiti) who asked about subscription services for PAS-2 programming. We have been able to secure subscriptions to CTN (the Chinese multi-channel service) for viewers in New Zealand, as well as subscriptions to Discovery and ESPN for those who live outside of New Zealand and Australia - although the costs are very high."

Selwyn Cathcart, Telsat Communications Ltd
tel 64-6-356-2749

We are aware that Discovery and ESPN will "do deals" but the last one we were quoted had a US$1,600 per year minimum which certainly puts it at the top end of the DTH fee schedule. ESPN and Discovery believe there is no such thing as a DTH viewer, so they charge you at "their minimum" assuming you are really a hotel or resort in disguise, using their service(s) on a commercial basis (i.e., feeding it to tens, hundreds of rooms). An apropos saying might be, "*Everything is for sale, what is a matter of disagreement is the price.*"

GWN via D9223 Experience

"My D9234 experience might be useful to others thinking of this receiver. On C-band, it requires a fairly strong signal to recognise digital. On Ku, where GWN is the reason I bought this unit, the software appears to be controlled to only recognise GWN. It can be 'fooled' at least for a short period of time. Go to the factory default when changing bouquets, or, rotate the LNB 90 degrees to get it to recognise another service on the opposite polarity (the Telstra Bouquet at 12.301 was originally prime for this until they went to CA). When a bouquet is recognised and loaded, if the previous channel allocation does not fall within the new service, it is left in memory; for example, GWN will remain at location 67 if you load Mediasat at 000. So it is possible, although tricky, to maintain more than one bouquet at a time in memory."

Alek Zapara, Waikiki, WA

Any additional 'how-to' reports?

And The Horse Your Rode In On ...

"Bravo for standing up to Nokia. Regardless of any corporate policy they might have, there is plenty of support for Nokia in the Pacific, by way of their European distributors. Despite the corporate presence of Nokia at international satellite and cable shows in Hong Kong over the last few years (their attempt to sign up new distributors), I know of no person who has ever had the courtesy of a reply to any letter, fax or email from this arrogant supplier. They do not deserve our support!"

Garry Cratt, AV-COMM Pty Ltd, Balgowlah, NSW

Nokia is a strange group, indeed, perhaps the result of living in near total darkness six months a year and eating fish three times a day including for dessert.

What they have done is create the world's most innovative MPEG-2 IRDs and then establish marketing policies written with disappearing ink on discarded fish skins. Common courtesy is totally uncommon at Nokia and were it not for the legion of loyal (but frustrated) distributors world-wide, their user level popularity would be below even Scientific Atlanta.

HARDWARE EQUIPMENT PARTS UPDATE

APRIL 15, 1998

Palcom 7700 analogue receiver with "auto focus" tuning will appear through distributors late - April. The new receiver, currently being tested for review in SatFACTS (May issue) is quite possibly the "best all around analogue receiver" yet to be released to market. Bay Satellite, Satech, Skandia Electronics are stocking.

Nokia's European distributors are hawking what appear to be two "new" versions of their 9600 series IRDs; the 9602 is reported to be a "totally glitch free" NTSC or PAL format receiver that does PowerVu and anything else in the sky as long as it is FTA. The 9600S in the hands of Steffen Holzt (Noumea), obtained from French sources (reportedly around FF2500), does everything the 9602 does and adds two separate CA systems on board - a built-in Viaccess system plus a CAM slot. A source at Nokia advises, "The *9602 is a limited version for Scandinavia only and Nokia considers it illegal to sell outside as it contains a telemodem. The 9600 is the real FTA common interface receiver and once Irdeto complies with the standard, it should work with that version of CA as well* (perhaps by mid-1998)." Perhaps, but the "S" version in the hands of Holzt does, he reports, "*everything perfectly - gone are ALL of the Nokia glitches.*" He had no difficulty locating and purchasing a quantity in France. Try: www.TELE-satellite.com/TSI/9802/nokia.shtml.

What does Scientific Atlanta "land" a D9234 in Sydney for? Pricing quoted for this IRD for the Japanese NHK service hovers around A$2300 within which they say 22% sales tax is $102.76. How does that work? SA elects to pay sales tax on "landed cost" rather than allowing it to get larger and larger through markups. That is helpful ... to anyone who wants to compute what SA Sydney pays SA Canada for this IRD. A quick spin with the hand calculator will produce an answer near A$467 landed. Which works out to 394% mark-up when sold to NHK viewers at US$1,195. If you applied 394% mark-up to your "dealer/installer" cost of A$2300 the IRD would end up in consumer hands at A$9,062. Holy Bandito!

New generation MPEG-2 chips scheduled into IRDs by first quarter '99 will cause major change in IRD performance and pricing. Chips operate faster, far lower power consumption (running on 5 volts and even 1.8 volts), and offer "system-on-a-chip" design (reducing total number of chips required to process MPEG-2). Philips has new TDA8060 "Zero-IF" down converter which eliminates entire circuits (IF oscillator, mixer, SAW filter) and promises 30% cost reduction in chip-support parts. Moreover, when this chip is combined with existing (Philips) TDA8043/8044 QPSK demodulator/FEC corrector, and TSA5512PLL frequency synthesiser, the resulting MPEG-2 receiver requires no alignment after assembly. This means manufacturers will be able to plug in the parts, close up the box and ship the IRDs after a brief "smoke test." Combined cost of the three chips is US$15.13, bunches lower than present cost of IRD chipsets. The fabled "US$200 FTA IRD" is now less than a year away. What does CAM equipped IRD cost at manufacturer level these days? US$130 in parts, labour and burden on average.

Irdeto CAMs? Tough to find if you have a receiver that needs one. And expensive. Several cautions: Irdeto CAMs are now "country coded" and those you find in Europe, if so coded, may not play here. Caution two - watch out for "*Oh by the way - you have to change out one IC in the CAM...*" since changing it may quickly destroy the CAM. Having said that - pricing is in region of US$60 to $75 in small quantities.

New MPEG-2 IRDs. Canner Communication Corp. FTA 3-31 Msym, auto FEC, auto C/Ku, on-screen set-up, RCA and VHS outputs. Samples in May, price TBA. PowerCom DSR-2100A does SCPC, MCPC, NTSC/PAL thru-put, multiple LNB(F) control capabilities, pricing near $A950.

To Subsidise or Not to Subsidise - that is the question

THE CHALLENGES FACING DTH PROGRAMMERS

Here is the problem in a nutshell. Satellite programmers need to reach the largest possible audience at the lowest cost per viewer. Digital transmission reduces transmission cost per programme channel (simply because multiple programming channels can share a single transponder) but increases the cost at the viewer location. Why?

Digital IRDs cost upwards of $US300 even when purchased in large quantities. And someone has to pay for them. When the digital IRD is expanded into a DTH receiving system (including antenna, mount, LNBF, cable, fittings, a telephone line modem for PPV [pay per view] and the installation), it is very difficult to supply this package for under $US600. Some would say it is impossible.

If the satellite programmer waits around for the consumers to pay the *total* cost of a DTH installation, experience shows only a very small take-up by the potential buying audience; typically under 5% (**1**). As Galaxy/Australis learned in Australia, the take-up of pay TV satellite packages occurs far faster when the pay TV programmer reduces the cost of the equipment to the consumer by *subsidising* that cost (**2**).

In all of this world of high finance, the multiple outlet installation presents unique technical and financial problems. Financially, the programmer must provide a separate IRD for each TV receiver in a multiple outlet location. At $US300-plus per IRD, how does the programmer get his money back for the additional IRDs? Obviously, a charge must be levied. But how much and how does that charge relate to the level of customer acceptance? For sake of illustration suppose the programmer sought to recover the $US300 cost in 30 months at $US10 per month. In effect, the programmer is paying $US300 for an IRD and then renting it out hopeful that in 30 months time he will have the original investment back. This scenario precludes the IRD breaking, requiring any service calls, or otherwise attracting additional cost for 2.5 years. If any of these things do happen, the programmer must wait beyond 30 months to recover his investment in the "second set" IRDs.

The programmer could insist that people who desire second set access to the service simply pay up front for the second IRD. Experience tells us very few would be sold under those circumstances.

There is one particular class of multiple set customers who create an ever more significant problem - motels and hotels. Here the programmer faces several unique problems including IRD security, IRD misuse (every new motel customer somehow has to be taught how to properly use the IRD and for a *one-night stand*, most cannot be bothered), even IRD abuse. The Galaxy experience in attempting to service motel and hotel clients is illustrative; basically, they quickly decided they could not afford these problems and consequently discourage commercial customers. Sky NZ, coming to satellite from an analogue encrypted UHF TV distribution world, has already established a sales policy that not only accepts but actively courts motel and hotel business (**3**). Still, the present Sky commercial customers deliver Sky UHF band analogue transmissions to the commercial rooms through an in-room television receiver that requires no IRD or other special on-premise receiving equipment. All of this will change with the transition to satellite digital service.

The cost of the IRD, and the risk of having the IRD in a commercial facility where the users may change room for room on a near daily basis becomes a major challenge facing digital satellite programmers. Perhaps the Galaxy policy is best - simply ignore commercial establishments as "too hard, too expensive" to do, at this point in IRD development.

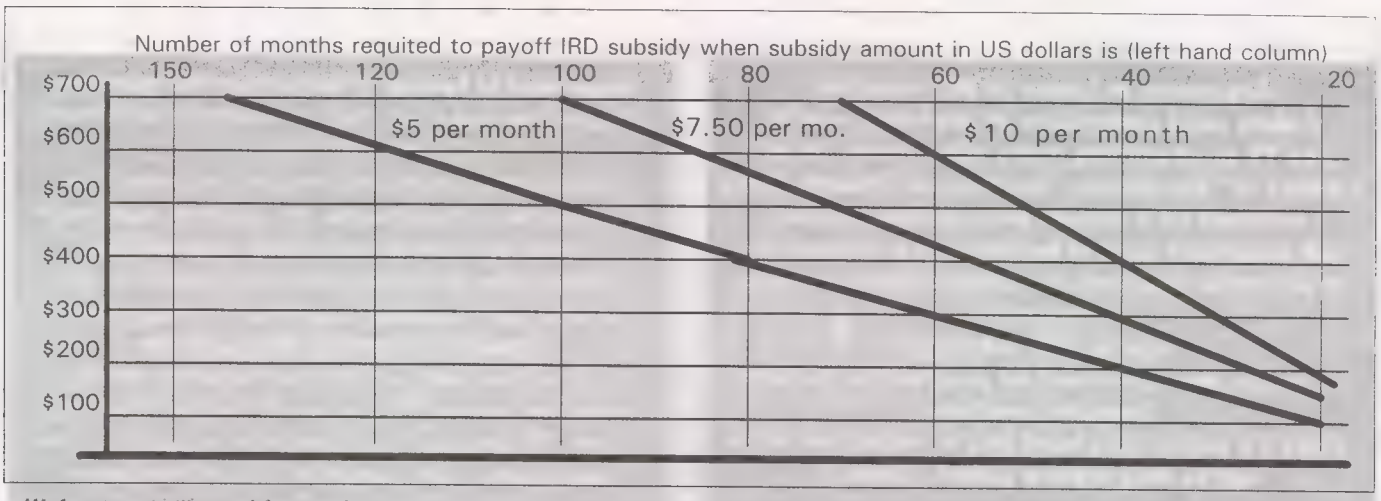
The Subsidy Argument

A digital satellite programmer who elects to subsidise customer IRDs takes this business course convinced (or very hopeful) that by lowering the consumer's "entry level cost" to satellite delivered pay TV, the consumer

1/ Sky NZ numbers, released November 1997 covering April 1 to October 31 (7 months) show 3.1% of potential DTH households subscribed to Sky. These subscribers paid $NZ650 to have Sky satellite service installed, including programming costs for the first year; equal to $54.17 per month, paid up front for the full year.

2/ Galaxy has offered installations for as little as $A19.95 although the current price is $A199.95; still well below the $A1,100 cost of the equipment installed at the consumer location.

3/ Sky NZ claimed 3,155 "commercial" customers as of October 31, 1997; 1.1% of its total customer base but because of higher charges per customer per month - multiple rooms attract higher charges than residential homes - nearly 5% of its gross revenue comes from this customer category.



will become a monthly paying customer sooner - than later (or never). The business theory is this:

"The real revenue comes from 'cash flow' created by a subscriber paying his bill, every month. If, by lowering the cost of becoming a subscriber (the installation fee), a viewer becomes a monthly invoice paying customer 6 months sooner, then the programmer begins to realise his customer cash flow that much quicker."

As Galaxy learned with their $A19.95 installation offer, this can be overdone. By lowering the price too dramatically, the consumer feels as if he (or she) has no "real investment" in pay TV and they will be much quicker to order the service discontinued at $19.95 installation than at $199.95 installation. In both cases they will "lose" the installation fee when they ask the service to be terminated. $199.95 is far more to lose than $19.95 and the typical consumer is apt to continue paying $50 (or whatever) monthly charges because they do not wish to "lose" the $199.95 installation charge.

The other impact a $19.95 installation fee creates is on the pay out period required for the subsidy of each installation. With A$1,100 "cost" in an installation (IRD, antenna - the whole package, installed), Galaxy faces a $900 "subsidy" which must somehow be paid just to get back to the point where the monthly subscription income is actually "income." Until that point, some amount of money is coming off the top of the monthly subscription income to pay back the subsidy cost. The service provider has to pay for the complete system, including installation labour costs, and all of this happens up front, at the time when the customer is first installed. With $1,100 "cost" and an installation fee charge of $199.95, Galaxy ends up with $900.05 on the books to *pay off* for each subscriber. At $10 per month, that is 90 months (7.5 years!) of paying off each and every new customer's subsidy **(4)**. Few of us would be willing to assume an IRD purchased with 1998 technology will still be used in 2005 (that is, newer technology would have antiquated the original 1998 IRD long before the subsidy is in fact paid off).

Squeezing The Monthly Revenue Stream

If the name of the game is to encourage people to pay the programmer sooner, there must be a great deal of money to be made within the monthly revenue stream. Not necessarily.

Sky NZ financial results released in November 1997 show a six month total income of $85,093,000 ending June 30 (1997). They also show a cost of programming of $36,993,000. In other words, 43.4% of every dollar Sky took in went back out the door to pay the programmers. That tells us that with a (NZ)$50 per month subscriber cost, $21.70 was paid out to the programming sources making up Sky's Sport, Orange, news, movie and Discovery programming channels. Another $14.18 (28.4%) was paid out for "subscriber management, transmission and general administrative overhead." Out of $50 per month, that *leaves* $14.12 per subscriber per month to cover such items as IRD subsidy, interest, and profit. There is obviously very little profit here **(5)**. In fact, with Sky leasing two full Optus B1 transponders by the middle of 1998, their transmission costs alone will more than double over 1997 levels further cutting into the $14.12 "left" after paying normal terrestrial transmission delivery costs.

4/ To pay the $900.05 cost differential off, Galaxy has to borrow money from someone. This money costs interest, which adds to the $900.05 initial cost and this increases the subsidy payoff period by the interest amount. At 10% interest for 7.5 years on a declining balance basis, Galaxy assumes an additional $384 in actual "cost" for each installation. This turns a 90 month pay back period into a 128.4 month pay back period (10.8 years) if $10 per month out of the subscription revenue is assigned to paying back the initial "subsidy" of the installation. And this assumes the original IRD will in fact last 7.5 or 10.8 years, and never require any service or maintenance (at additional cost).

5/ Sky Network Television Limited also had an interest expense of $NZ8,024,000 or $4.67 per subscriber *per month* out of a gross income of $50; 9.3% of their revenue was spent on interest. The long term effects of not enough margin are obvious; Sky had a "deficit in stockholder equity" of $NZ73,144,000 at the end of accounting year 1996.

Arguments in favour of IRD subsidies

✓ More rapid penetration of marketplace with pay-TV programming (more subscribers, faster)

✓ Ability to "standardise" installations through rigidly enforced DTH system procurement policies (all equipment used in installations is sourced by programmer resulting in uniform costing for each installation)

Against IRD subsidies

✓ Greatly increases need for programmer to have financing available

✓ Pay TV subscribers have less invested, are more apt to drop service (called "churn")

Arguments in favour of Subscriber IRD purchase

✓ Subscriber pays full cost of reception equipment (DTH/TVRO system)

✓ Subscriber bears maintenance responsibility

✓ Subscriber is responsible for updating equipment when technology outmodes original IRD

✓ Subscriber is far less likely to cancel pay TV service with sizeable investment in equipment

Against Subscriber IRD purchase

✓ If full payment up-front is required, selling consumer on pay-TV is a much tougher challenge

✓ Pay TV operator loses one level of control (the equipment) over subscriber use of hardware

Additionally, as the number of programming channels increases (as Galaxy has learned with its present 21 programme channels), the cost of programming rapidly escalates. Here again, there is a dilemma. If the programmer has too few programming choices, the customer is not attracted. If he has too many, the customer feels he is paying for service channels he/she "*never watches*" which is itself a turnoff to subscription. Moreover, each new programming channel adds incrementally to the total cost of programming per month for the service operator. At some point too much is paid for programming, and the service provider is prevented by marketplace realities from increasing monthly programme package charges. All of this creates new pressures on the squeeze to make the programming dollars come out with a profit at the end.

The IRD / installation "subsidy" is often the one cost which makes the difference between making a profit, breaking even, or losing money.

One way around this catch 22 is to offer programming on a choice basis; allow each subscriber to select which programming channels he or she wishes from an a la carte menu. Suppose, for example, Galaxy offered its present 21 programme channels but allowed subscribers to take *only* those that they wished to take? With 16 channels at $50 per month (**6**), the average cost per channel becomes $3.13 per month. If individual channels were priced from $2 to $10 per month (sport being the most expensive, followed closely by early-run movies), an individual subscriber might spend far less than the present $50 per month fee. There are two sides to this coin:

1) The service provider only pays his programming source (such as Discovery) for the number of actual subscribers; if out of a 300,000 subscriber universe only 30,000 homes elected Discovery from the a la carte menu, the service provider pays far less to Discovery than would be paid if all 300,000 subscribers automatically got Discovery whether they ordered it or not. This has an immediate positive effect on the service provider's programming costs, perhaps freeing up badly needed funds to help defray the IRD / DTH subsidy costs.

2) From Discovery's point of view, this is not a desirable option. They receive far less income from the service provider who now no longer guarantees "*100% penetration*" for the Discovery programming. Two things happen next. First, the cost of Discovery for each home taking the service through the provider goes up: fewer total homes, greater cost per home. Second. Discovery relooks at its contract with the service provider and decides it can no longer afford to give that provider "exclusive" rights to its programming if the provider cannot in turn guarantee 100% penetration with the Discovery programming.

If the provider has no competition, having the exclusive right to Discovery is of minor importance. When you operate the only store in town, you don't need an "exclusive" from the dairy company to sell their milk.

The danger with totally a la carte offerings is obvious: how does the service provider recoup his IRD / DTH system subsidy from subscribers who select only a few programme channels? $US10 per month planned for retirement of the installation subsidy does not compute when the a la carte subscriber ends up paying less than $10 *total* for his programming selection.

Another form of a la carte is pay per *view* programming (as opposed to pay per *channel*). Pay per view (PPV) events currently trialled vary from rock concerts and wrestling extravaganzas (often in the $20 to $30 per event range) to movie selections not yet available on the normal full-time movie channels. The movie selling game is especially complicated.

Movies are first released to theatres where they command *per seat* fees. When the "*theatre window*" closes, the same film is offered on VHS tape (and now

6/ Galaxy presently transmits 21 programming channels although 5 of these are offered only a la carte. Their "basic" package consists of 16 channels for $A3.13 per channel per month. Japan's PerfecTV offers channels totally a la carte, Murdoch's BSkyB digital service reportedly plans various groups of channels for a basic fee, additional channels a la carte, like US DTH. The trend here is towards subscriber options to suit subscriber interests.

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DVD) on a *per* (viewing) *time frame* (typically 24 hour) basis. As this time window closes, PPV operators have access to the same film which they sell on a per view basis (one showing for a fee). As that time window closes (and by now we are typically 9 months to a year after the film was first shown in theatres), the same film appears on movie service subscription channels (HBO, et al). The programme operator now receives use rights to show the film one or more times during a specified time frame (such as one month) and the full month's programming schedule is built round a collection of films rotated in time and day of the week.

PPV events can be sold to anyone provided the technology is in place to identify each viewing location and collect money from that location. The digital IRD offers that opportunity because it has a unique electronic address. The customer must communicate with the service provider to "order" a specific film or event at a specified time, and the service provider in turn "addresses" the customer's unique IRD electronic address authorising play of the ordered event. Early version IRDs (such as the DGT400 used by Galaxy) require the customer to *telephone* the service provider to order the event. Current versions build into the IRD a telephone modem which automatically connects the IRD to the service provider's computer. The viewer uses an on screen display and the remote control to select an event and viewing time; the modem transmits this request along with the identity of the IRD to the service provider. Built into this data stream is bank charging or automatic debit instructions allowing instant collection by the service provider.

Modem equipped IRDs are cutting edge technology and depend upon the technical integrity of the telephone provider to function properly. In world regions where telephone service is poor or non-existent, the automated modem technology is troublesome. Sky New Zealand's planned use of this technology will be the first real test in this region of the world. As you might suspect, adding a telephone modem to the IRD does increase the cost. This in turn makes the subsidy differential greater - *adding* to the number of months required for the subsidy to be paid off.

What is unproved here is the technical reliability of the modem and telephone interconnect (a high failure rate will add significantly to the IRD base cost with service visit expenses). The programme service provider will also be on new "marketing ground" in attempting to convince consumers they should pay fees upwards of $5 in local currency to view a movie a few months earlier than the same film will appear on a regular movie channel service (for which a much smaller per-movie charge will be made). Even further down the track the film ends up on FTA television with yet another drop in cost per household use rights.

The ability of an IRD to be "addressed" and to respond to specific commands transmitted within the data stream is critical to the future of digital television. The commands that say, "*Yes you* can *watch this programme"* or, "*No, you cannot watch that channel*" are to be the cash registers of the 21st century. Free to air television, as we have known it for 50 years or more, is unlikely to survive beyond the demise of analogue broadcasting except as a propaganda service of a benevolent government or self-promoting commercial entities.

IRDs to be addressable must also be "communicative." That is, to make PPV and PPC (pay per channel) work as a successful business venture, the human being must somehow be removed from the equation. On screen menus, accessed through the viewer's remote control and used as "order pads" for the selection of programming, are a first generation attempt to get the human being out of the way and off the telephone ordering one programme at a time from the content provider. By 2010, IRDs will do far more than simply offer programming, take orders and transmit those orders through a telephone modem to the content provider. Within five years the IRD will be an "Internet machine" while within ten years it will do everything the ATM on the corner now does except hand you crisp, new $20 notes. In fact, within ten years it won't need to hand you $20 notes because the personal ID card you slide in the slot will become a portable ATM in your pocket. The on-screen menu will ask you "*how much credit do you wish?*" transferred to the ID card you have placed in the set top box before calling up the bank on your screen. In seconds, the IR executed commands will result in "funds" being *transferred* to your card and with the card back in your pocket, you are ready to go off shopping "spending" the reserve from the freshly loaded card.

All of this will require IRDs and modems of increasing integrity. Today's IRDs, fault filled and incredibly unfriendly for consumers to use, will within five years be superseded with models three and perhaps four total generations improved from today's risky boxes. And therein we find the primary reason why any programme service provider investing in IRDs *today* will be financially troubled by the cost of scrapping those IRDs and replacing them - long before the $10 a month subsidy has paid the boxes off at the bank.

No Final Analysis

These are problems which will not go away, and will not be answered without some very creative planning. And while IRD prices will drop with volume production and lower cost chip sets to process MPEG-2, very little relief is likely before year 2000. In the interim, existing digital bouquet operators try to juggle the numbers while new, start-up operations such as Sky NZ watch the MPEG IRD developments with a daily interest. The world may be going digital, but not without substantial cost.

HOW WILL WE DELIVER DIGITAL to MULTIPLE TV SET LOCATIONS?

Distributing satellite digital format services to any location with two or more IRD equipped television receivers requires the following:

1) That each TV set connected to the common DTH/TVRO antenna have an appropriate IRD in front of it;

2) That the LNB(F) at the antenna be capable of delivering service to two or more IRDs simultaneously;

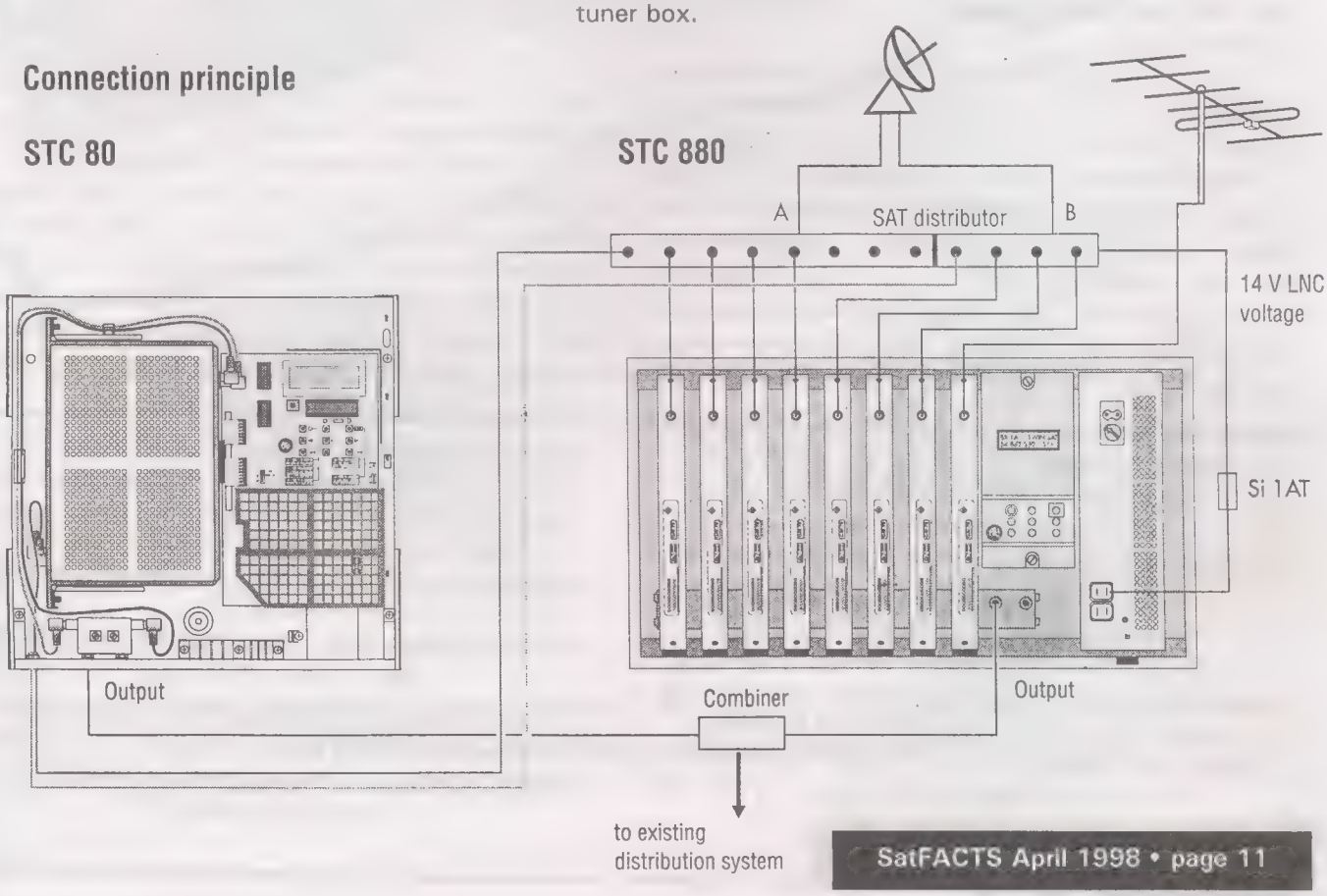
3) That the distribution system between the LNB(F) and the individual IRDs be capable of transporting the satellite originated MPEG service bouquets to the IRDs.

Each of these elements presents practical (as in "can it be done?") problems as well as economic challenges. Working out one or more technical solutions to the problem only solves half of the requirement; if the solution costs more than the revenue for the service justifies, it is not the proper solution. This can be done, as it is being done in Europe, by equipping each *multiple dwelling unit* (MDU) facility with a "headend" system that converts the incoming format (whether terrestrial or satellite, analogue or digital) to a PAL B/G format channel which can then be distributed on an existing coaxial cable distribution network. This is the basic premise of community antenna (CATV) television and in the Grundig example below, a main frame master unit accepts plug-in signal processing and channel creation modules for each TV channel to be added to the system.

This approach assumes no MDU television receiver is equipped (with an IRD) for direct digital reception and for some types of facilities (such as a motel or hotel) it may well be more economical to one-time process the individually formatted programme channels at the "headend" than it would be to leave the signals in their original (digital) format and require processing at each receiver location. You can do this, today, with off-the-shelf hardware at an approximate cost of US$1,200 per TV programme channel.

THE GRUNDIG SOLUTION - Use existing coaxial cable distribution system covering frequency range 40 - 890 MHz, transfer all incoming services (whether terrestrial or satellite - and whether satellite is digital or analogue) to a PAL B/G standard format TV service channel which is tuned within the facility one channel at a time by either existing TV receivers or receivers upgraded with addition of cable television type set-top tuner box.

Connection principle



Headend Approach - Direct Tuning TV Sets

✓ Process all input programming channels at "headend" to 40-800+ MHz region as PAL B/G output signals

✓ Distribute through coaxial cable to MDU TV sets equipped with 40-800+ MHz tuning, either directly or through set-top (cable) converter

IRD in Room/MDU Approach

✓ Distribute off-air (terrestrial) TV signals as received with or without individual channel processing (typically in 40-890 MHz range)

✓ Add to this system - distribution of L-band off-satellite channels in 950-1450 (2150) MHz range

If you have 30 rooms to service, and ten channels of service to process, spending $12,000 at the headend could easily be better than purchasing a separate IRD for each room and dealing with the service problems which 30 IRDs would create. Thirty IRDs, by the way, would set the system buyer back at least $US15,000 so it works out less expensively to do it at a headend as well. In larger facilities, with more than 30 individual TV sets to service, a 10 to 15 channel system will always work out less expensively if there is a headend rather than IRDs at each viewing location.

However, there may be additional business requirements which mandate that an IRD *will* go into each room; *period*. And hang the cost. Now, what are the new challenges here?

As the number of channels increases, the cost of the headend increases. Not only is more processing equipment required, but the space consumed by the equipment, the electricity it uses, the maintenance required and the amount of heat generated add up to major challenges. At some point in channel growth, assuming all of the available channels are to be distributed to each viewing location, the "headend" approach becomes unwieldy even for 100 to 200 room establishments.

Moreover, digital service providers consider each viewing location to be a potential "money spinner." If pay per view movies and sporting events are routinely to be offered, a motel or hotel offers a higher than average prospect for impulse purchase of such events than the typical household (business travellers, in particular, are more apt to order a pay per view event than a household on a fixed budget). The headend processing approach makes it almost impossible for economic delivery of pay per event sales. Somehow, the motel customer has to have access to a standard IRD and a method of using that IRD to order a pay per view event. And this says that a technique must be found to place the IRD in the room where it can be used directly to order a film or sporting event.

Now - for the IRD to be share a single, common. DTH/TVRO antenna / LNB(F) - between the LNB(F) and the IRD there must be a coaxial cable reticulation system capable of allowing the total number of rooms in the establishment to properly access the LNB(F) L-band signal. And this simply means an L-band rated cable network consisting of cable, amplifiers, connectors. signal tap-off devices and splitters as a minimum. If all of the L-band digital services will be using transponders on a single polarity from a single satellite, the design step follows standard cable TV practice.

The IRD Problem

IRDs selected by a programmer have their own, often unique, CA (conditional access) system. The least complicated for-the-programmer approach is to insist that "standard" IRDs distributed for home use also be utilised in MDU installations. In this situation, the MDU site requires an L-band (950-1450/2150 MHz) distribution system interconnecting the DTH/TVRO receive antenna and LNBF to the individual TV sets.

Satellite DTH uses a modulation format known as QPSK. As long as the processing system does not injure the QPSK modulated waveform, and delivers through a suitable coaxial cable network the IF L-band signals to the waiting CA equipped IRDs, the individual receivers will function just as they would in a simple one-TV set home environment. The system designer lays out (plans on paper) the coaxial cable network just as would be done for the lower frequency bands (40-800 + MHz) but allows for the far higher cable losses. An MDU

Disadvantages of Headend Approach

✓ Loss of ability to individually address MDU receivers

✓ Without re-encryption, loss of ability to control channel line-up to each MDU receiver

Advantages of Headend Approach

✓ With possible change out of existing amplifiers, cable distribution system as presently exists can be utilised for addition of satellite fed channels (assuming system is "good" to 800 MHz-plus to begin with).

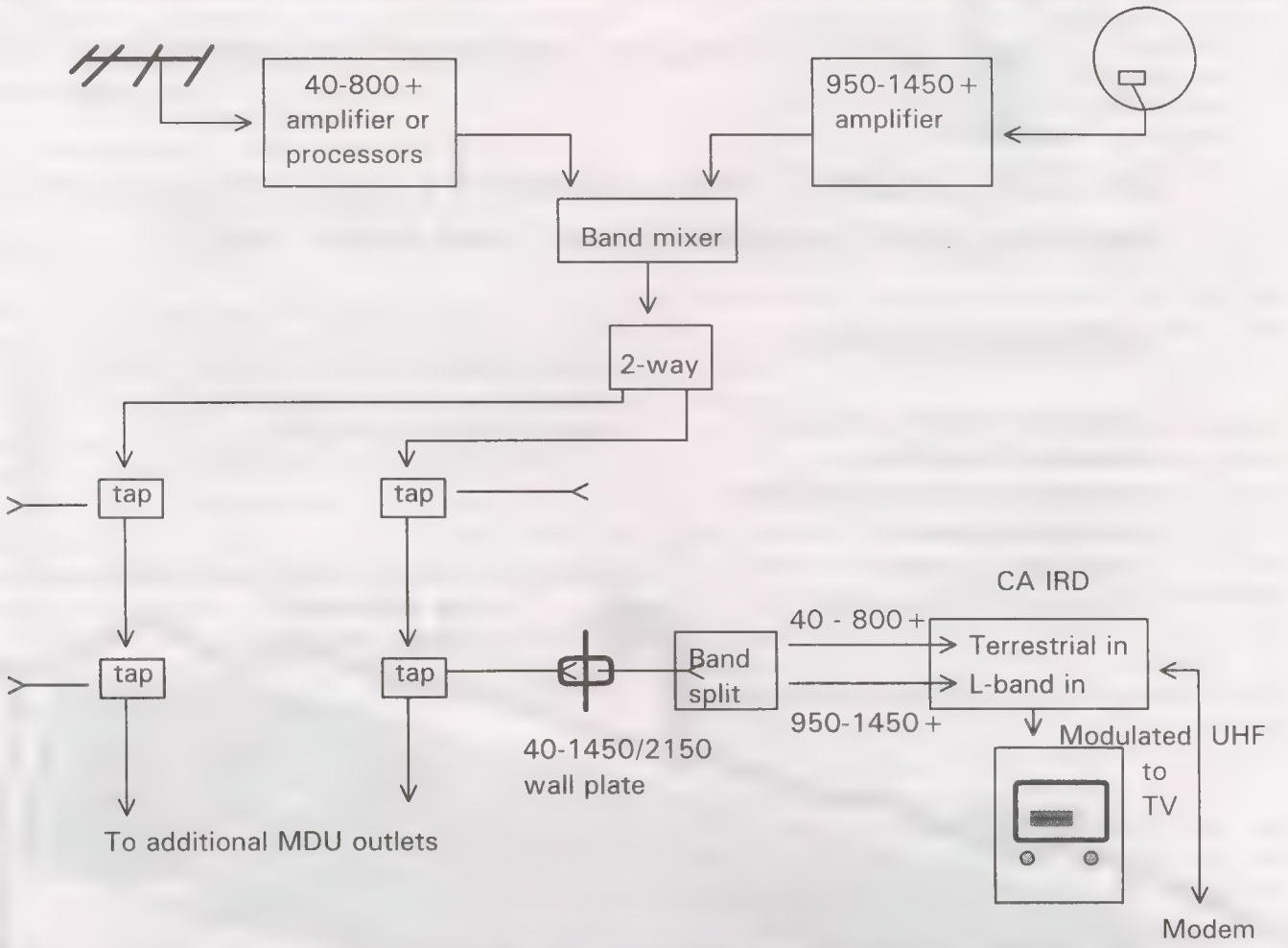
Disadvantages of IRD in Room Approach

✓ Cable distribution system must be capable of passing signals in 950-1450 (2150) MHz region (may require new, second L-band capable distribution system "parallel" to existing VHF-UHF system)

✓ In room outlets must pass terrestrial analogue and digital L-band to TV set

Advantages of IRD in Room Approach

✓ Potential for IRDs to be individually addressed through satellite CA data stream allowing pay per view/event selling



installation requiring 20 dB of "headend" amplification to overcome cable losses for the 40-800 + MHz region will typically require twice as much amplifier gain (40 dB total) to reach each MDU outlet at 1450 MHz and even more gain for 2150 MHz.

What this accomplishes when you are finished is a cable distribution system capable of delivering analogue format terrestrial TV in the 40-800+ MHz region, and, L-band (satellite IF) service in the 950 - 2150 MHz region. This in turn makes it possible (although perhaps not dollar practical) to equip individual rooms in a motel or individual living units in a multiple dwelling unit with a standard IRD for direct satellite reception.

The downside of this approach is that buildings or MDUs previously wired with 40-800 MHz cable and hardware (splitters, amplifiers, fittings, wall plates) simply will not "pass" (work) for L-band signal transport. The cable losses will be excessive, the splitters and connectors will not function properly through the L-band frequency region, and the wall plates will create severe impedance (mismatch) problems. The installer is faced with two choices:

1) Rewire (as in replacing) all of the cable distribution system plant with L-band rated parts and technology, or,

2) Build a second, parallel, cable distribution facility "on top of" the older 40-800+ MHz system.

Neither of these is financially attractive and in older buildings where the coaxial cable may have been put into place as the building was constructed, it may not even be possible to rewire a building except by utilising outside corridors and exposed L-band cable plant wiring.

A New Option

Relooking at the problem, standard satellite IRDs tune the 950 - 1450 (2150) MHz region. This matches the output (IF) of the LNB down converter. But. pre-satellite coaxial cable TV "cable" distribution systems were never designed to work above 900 MHz. We have a group of frequencies (above 950 MHz) which we need to transport to IRDs that only recognise MPEG-2 signals when they fall between 950 and 2150 MHz. It is the

Typical RG6 series Cable Loss

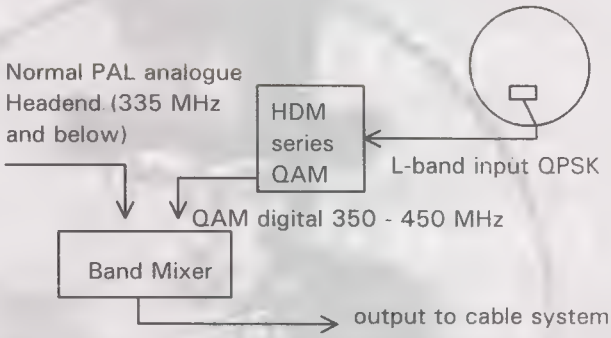
Frequency	dB per 100'
50 MHz	1.44 dB
240 MHz	3.00 dB
450 MHz	4.17 dB
800 MHz	5.60 dB
950 MHz	6.25 dB
1450 MHz	8.50 dB(1)
2000 MHz	10.4 dB (1)

1/ Neither RG6 nor RG11 cable is routinely rated (nor "sweep tested") above 1000 MHz. Cable should be checked on the roll for losses above 1000 MHz before planning a distribution system around approximate numbers.

transportation system, between the headend and the IRD locations, where the 950 - 2150 MHz "problem" appears.

Tests first conducted at Nuremberg (Germany) by Deutsche Telekom in mid-March show one interesting solution to this problem. Standard satellite MPEG-2 service uses a modulation format known as QPSK. There are others, equally attractive and for some applications better than QPSK. QAM is one of these.

Grundig has designed a (motel, MDU, cable) headend QPSK processor that takes a standard bouquet from satellite, through the L-band input, demodulates the bouquet and turns it into a QAM (modulation format) digital bouquet. The HDM 100C + P modular headend then outputs to the cable system in 8 MHz wide digital bouquets. In the spectrum analyser display shown here, (PAL) analogue signals are processed from near 50 MHz up to 335.25 MHz while QAM digital signals fill the spectrum above 342 MHz to near 450 MHz.



This allows the existing, not L-band rated, cable distribution network to carry digital TV bouquets to IRDs fed by the system. There is no need to rework the cable distribution network; all of the changes take place at the headend unit.

GRUNDIG's HDM 100 C + P digital conversion system displayed on a spectrum analyser at Deutsche Telekom in their cable TV network in Nuremberg. Four left hand carriers are standard analogue (PAL) services with the upper frequency most analogue at 335.25 MHz (cable channel S25). To the right QAM digital services which in this test extended upwards to 450 MHz region. In this system, analogue and digital travel through the same cable network with the digital operating within the original cable network specs.

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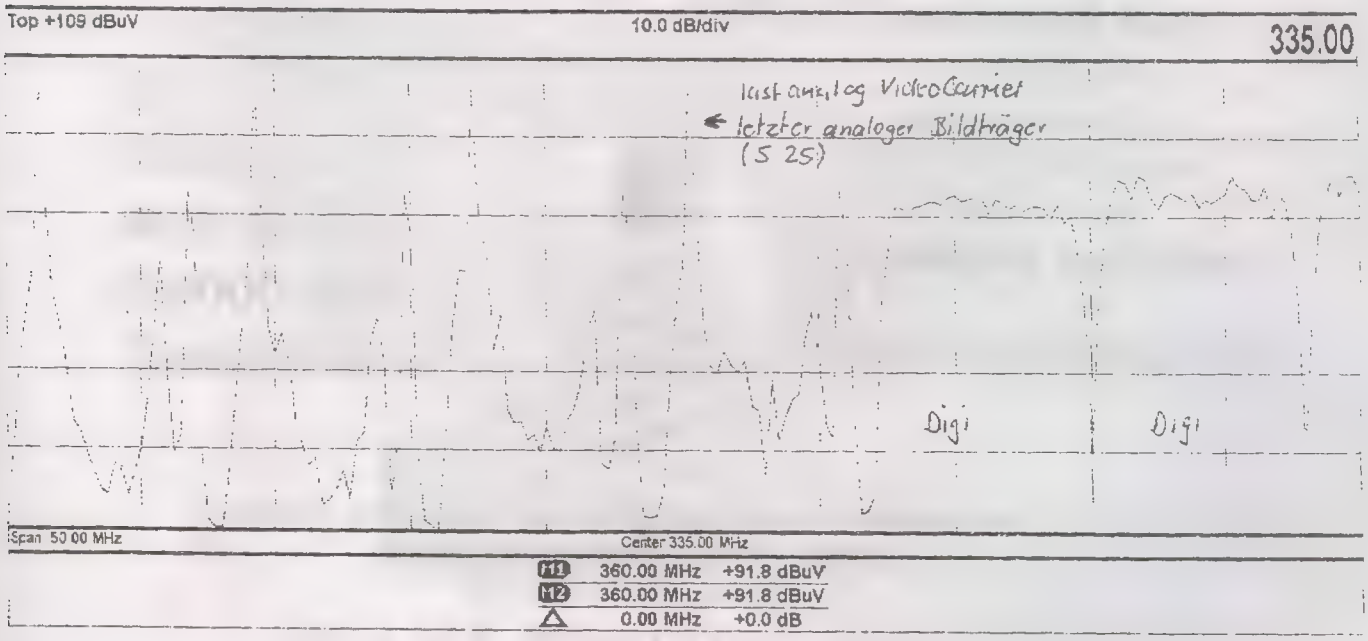

Operator: Deutsche TELEKOM
Area: Cable Net Nuernberg
Location:
Description: Last analog Channels >>> digital Channels

File name: a.spc

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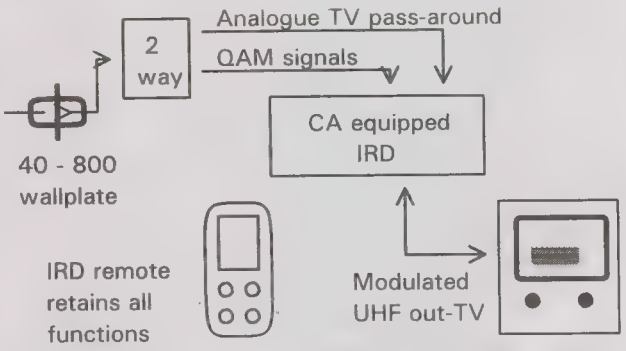
The "Hook"

The standard IRD tunes the frequency range 950 - 2150 MHz. To function within the new cable environment, the IRD tuner must be replaced so the IRD now tunes the cable TV frequency range (of at least 50-550 MHz). It turns out that Nokia and many other IRD suppliers have a version of their IRDs already available to do this.

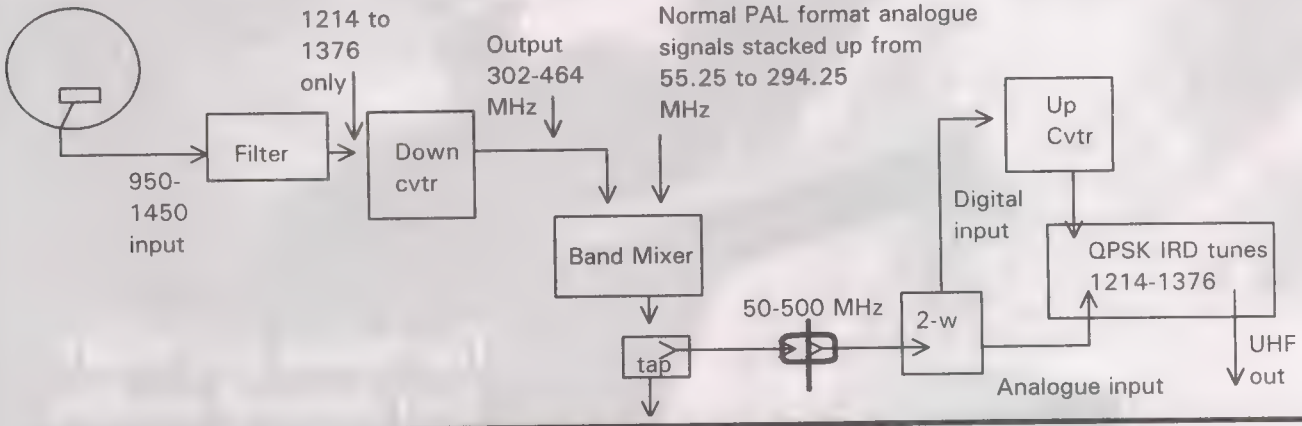
The second "hook" is the requirement the IRD be capable of recognising and processing QAM rather than QPSK modulation. Again, there are Nokia models pretty much off the shelf ready to do this.

The major "ouch" with this approach is that the programmer (or other source of IRDs) must stock/supply IRDs capable of QAM demodulation and able to tune the cable TV channels between 300 and 450+ MHz. The anticipated cost of the Grundig HDM series QAM processor is in the region of US$3,000.



This is certainly less money than rewiring even a small SMATV/MDU system but still not low in cost. The advantage of the HDM QAM processor approach is that it already exists and will be available shortly (1).

There is another approach, being worked on by at least two firms with SMATV experience. If the QPSK modulation format L-band signals are simply left intact and shifted in frequency (using a down converter at the headend) to say 302-462 MHz (see example, above), the original QPSK MPEG services can then be retransmitted through a cable distribution plant in their original format. At each IRD location, the cable coming out of the wallplate goes to a 2-way splitter where the PAL format analogue signals are fed through the IRD directly to the cable-tuning TV set. At the same time, the other output side of the 2-way splitter feeds the full cable bandwidth to an on-premise up converter which frequency translates the 302-462 MHz cable carriage QPSK bouquets back to their original L-band frequencies (1214-1376 MHz in our example below). Now the standard QPSK IRD sees the original L-band frequency and format MPEG bouquet and processes the signals as if they were coming directly from the satellite dish system.



QPSK Down/Up Converter Approach

In example, three 54 MHz bandwidth QPSK channels falling in L-band region 1214-1376 MHz are down converted at cable/SMATV/MDU headend to appear in normal satellite QPSK format in frequency range 302-464 MHz. This allows carriage in existing cable system. At each IRD location, 302-464 MHz is up converted back to 1214-1376 MHz where standard QPSK IRD demodulates.

The advantages to this approach is cost - an estimated US$500 to down convert the L-band QPSK to cable carriage channels, and under $100 per IRD location to up convert back to the normal L-band frequencies. The disadvantage is this system exists only in laboratory form at this time.

Early Days

The best news is that equipment designers are now recognising the need to make satellite signal distribution compatible with existing 40-800+ MHz cable distribution systems. Refinements are inevitable. cost reductions are certain, and as all of this happens the present technical problems facing satellite programmers attempting to reach SMATV/MDU customers will disappear. We'll keep you advised.

1/ Grundig HDM 100C+P. Horst Wieser, Wieser Electronics, Nuremberg, Germany fax ++49-911-44-0008.

a technical and marketing advisory

memo

to the membership from your industry trade association

SPACE Pacific

Satellite
Programme
Access
Committ**E**e

A trade association for users, designers, installers, sellers of private satellite-direct systems in the Pacific Ocean & Asia Regions

The Value of Certification

The "labour pool" that makes up the family of DTH/TVRO installers throughout the Pacific region is largely unskilled, self-taught through trial and error, and lacking in many of the fundamentals of basic electronics. During the February SPRSCS '98, we asked six of those attending the Mark Long SPACE Pacific certification courses about Ohm's Law. One understood it to the point of being able to calculate current flow through a resistor given the voltage and the value of the resistor, 4 had never heard of Ohm's Law and the last asked if we had any more cold beer.

Satellite TV attracts people from many, varied backgrounds. It is a telling commentary on the appeal of satellite TV that some of its most successful, competent and capable practitioners are people with absolutely no background in electronics.

Jumping in at the digital DTH installation point with no comprehension of how electricity flows through wires, and what happens if the elements making up the circuit are varied, is a bit like sitting down to watch a Tom Clancy novel based movie in the middle and spending the balance of the film trying to figure out the plot line.

There are two approaches to becoming a competent, skilled DTH/TVRO installer. You can stumble along making mistakes and learning from those mistakes, or, you can "go back to school" and take a cram course in satellite fundamentals. Stumbling along is expensive, slow and disjointed; not unlike reading every fifth page in a Clancy novel, in random order. "Going back to school" offers a start at the beginning, finish at the end - orderly approach launching with basics and landing with the complicated stuff that can only be understood after a foundation of basics.

Increasingly, SPACE Pacific is receiving queries from network providers who are looking for teams of installers to handle their system work. Most of this work at the present time is in the area of commercial installations for video and narrow band data. There is more Ku than C-band right this moment; the launch of Orion 3 to 139E later this year could change that balance.

SPACE provides these network designers with direct contact to SPACE members; installers and distributors will the skills required to get the job done in a professional manner.

The April 4th release of the SPACE Membership **Teck Notes** report includes a member survey to create a more appropriate data base of member skills and experience. Included on the survey question list are those relating to "formal training" in the satellite communications area. This information, entered in our data file, will then be made available to network designers who are searching for qualified installers for their own projects.

There is a circle here. Network planners come to SPACE to make contact with installers and once we understand the geographic region of their project and the technical parameters (C or Ku, antenna size, digital or analogue, narrow or wideband) the Installer membership data base search is executed. At the end, we feed back to

MEMBERSHIP IN SPACE

Membership in SPACE Pacific is open to any individual or firm involved in the "satellite-direct" world in the Pacific and Asia regions. There are four levels of membership covering "Individuals," the "Installer/Dealer," the "Cable/SMATV Operator," and the "Importer/Distributor/Programmer." All levels receive periodic programme and equipment access updates from SPACE, significant discounts on goods and services from many member firms, and major discounts while attending the annual SPRCS (industry trade show) each year in New Zealand. Members also participate in policy creation forums, have correspondence training courses available. To find out more, contact (fax) 64-9-406-1083 or use information request card, page 34, this issue of SatFACTS. Page space within SatFACTS is donated each month to the trade association without cost by the publisher.

the network planner detailed information covering all installers in the geographic region they require.

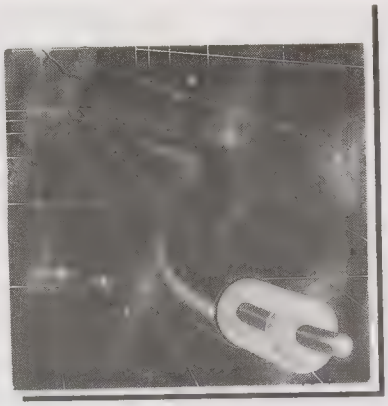
Certification in satellite techniques is far more important today than it was a year ago. And the SPACE Pacific Mark Long twin courses in digital and advanced satellite receiving techniques have (to our pride) become the benchmark measuring tools for this area of expertise. There are very few who would take exception to the statement that Mark Long is the most qualified teacher of satellite technology in the world today. His clients run from network operators (such as Measat) to trade groups. When we sat down with Mark to design the original SPACE Pacific courses two years ago, it was with the understanding that any courses offered must constantly evolve with the technology. Mark has supported this by creating his own web site (http://www.mlesat.com) and making himself available "on line" (E-mail mlesat@chmai.loxinfo.co.th) to students and those who might become students. Earlier this year Mark released his first (CD) "Asia/Pacific Satellites on Disk Library" which gives users the ability to call up on their PCs all of the technical and operating parameters for every present and future satellite reaching the Pacific and Asia. Further to that, updates are offered through the mlesat.com web site which simply means the data base never goes out of date.

None of this has happened overnight, and Mark Long with a now sizeable staff at his home base in Chiang Mai (Thailand) works 14 hour days making certain the integrity (accuracy) of the data is as current as information sources will allow. The missing element in all of this clever planning is the way you as an installer put this resource to work.

If you consider yourself an installer of DTH/TVRO, but are not yet a member of SPACE, this is a plea that you spend $75 to become an Installer/Dealer Member pronto. Then, armed with the resources of SPACE, we strongly urge you to prepare yourself for your own future (and present) by enrolling in at least one of the two SPACE Pacific Mark Long Certification Courses. You can preview how they work, and how as a "study at home" student you are gently prodded through the basics of satellite technology by going to Internet and keying in http://www.mlesat.com. If you are not yet an Internet user, return the perforated card appearing in this issue on page 34 requesting full information on becoming a member of SPACE. You will promptly be mailed membership information as well as a copy of the current issue of the only-available-to-members **Teck Notes** Bulletin.

Stumbling along making mistakes and hoping you remember what not to do - next time - is no way to become a professional in a high technology field that is reinventing itself with totally new technology every 15 to 18 months. Just when you have one level figured out, the technology changes totally! If you are serious about being in DTH/TVRO, become a professional - today!

The CABLE Connection



Weatherising

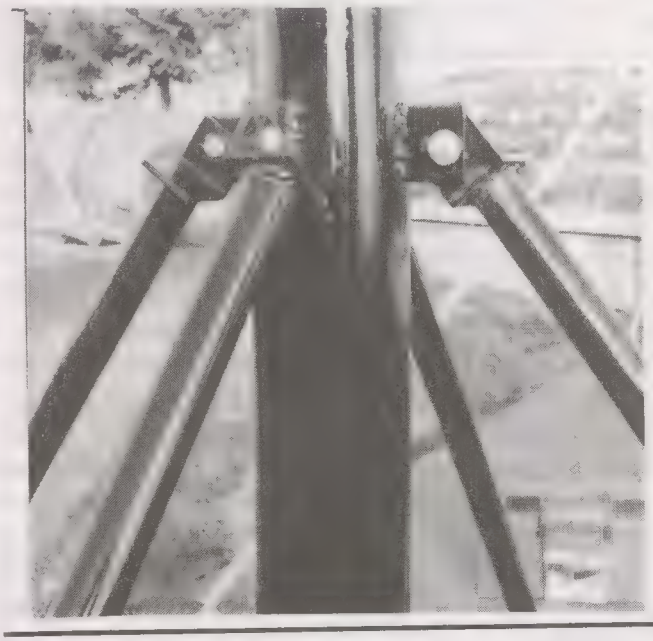
Some people attending February's SPRSCS '98 (see SF#43, p. 6) were between shocked and amazed to see Horst Wieser's demonstration of an LNBF completely submerged in a bowl of water, with F connector and cable installed (p. 7). "Amusing, but hardly important" was an oft overheard comment of the curious.

None of us will ever install an LNB(F) underwater, if for no better reason than microwave transmissions from satellites do not penetrate water so putting a dish below the water surface would be pretty stupid. That said, you don't need to be completely submerged in water to have moisture ingress problems with a dish installation.

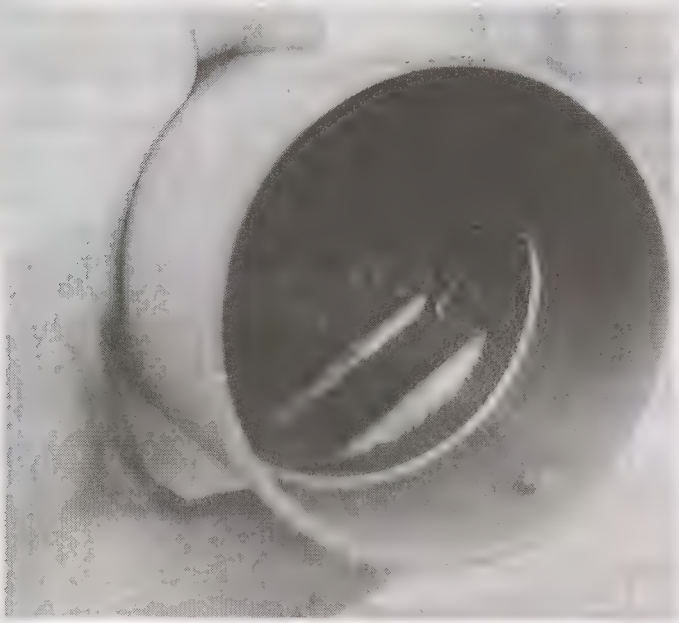
Common sense tells us moisture and electricity do not mix (see Coop's Comment, p. 1 this issue). And the most obvious place where you don't want water is at the F connector fitting at the rear of the LNB(F). Some connectors claim to be "water resistant" and a few even claim "water proof." There is no such thing as a connector standing alone that is waterproof; something more than the "bare" connector is required to keep water out. The very best item we have seen for this purpose is the Waterlock VS-01 snap and seal F connector covering that goes over the F fitting after it has been installed to the LNB(F). This is a moulded plastic two part, hinged covering that snugly fits around the F fitting and cable to stop moisture from getting to the connector proper. (Horst Wieser's demonstration of an LNBF underwater at SPRSCS '98 used such an F fitting cover). It might seem foolish to chase all the way to Europe for these clever parts but at this point no firm in the Pacific appears to handle them (Tratec Telecom at fax ++31-318-529104). The beauty of the VS-01 is that it comes off as easy as it goes on; unsnap to regain entry to the F fitting again. That is not possible with any other sealing system (tightly wrapped UV resistant tape, various Silicone sealers that harden when applied).

The primary problem with F connections is moisture ingress (getting "sucked" inward) between daytime and night-time temperature changes. The LNB(F) generates heat and you can feel that heat on the outer case. Moreover, it sits outside and for the majority of dish installations, it is not covered with a hat or other "sun screen protective device." Therefore the sun also warms

Dish mounts are an oft-overlooked source of maintenance problems. Hardware should be galvanised or stainless, support posts painted. Where practical, if you are not running cables down through support pipe, fill to top with concrete and drill "weepage" hole just above concrete pad line



up the body of the LNBF. When the air inside of the LNB is heated, it evacuates (escapes), just as steam rises. Air also circulates through the LNB drawing in from the probe end and exiting through the F connector (which typically has a tiny opening around the centre pin - just enough to pass air). As the LNB cools down at night, air circulates and often in reverse. When air is drawn through the LNB in either direction, it takes with



Oxidation on feed parts (including the interior/inside throat of the feed, and the scalar rings [not shown] as well as all screw/bolt attachment points) can be retarded if not stopped by dipping rag in marine grade rust preventive (such as Marinol or [Power Plus] Fish Oil) and wiping all metal parts. Oxidation inside of feed throat appears as white, chalky material the turns into dB robbing "flakes" of metal that impede the flow of microwave signals. (Thanks to Paul Burton, Waipu Cable TV and Robin Colquhoun (Auckland, NZ).

it any moisture that may be in the air. A humid day has not insignificant water content in the air. If the installation is close enough to the sea for there to be salt in the air (from evaporated sea water, sea breezes), the air drawn into the LNB fitting becomes a lethal weapon.

Air contaminants attack the metal fitting, the braid plus foil shield and the centre (copper or copper coated) wire. Any white, powdery substance on the F connector shell is a sign of problems. If when inspecting the copper wire centre conductor you notice either a greyish tarnish (sometimes grey-green) or a white, chalky coating, stop and carefully inspect the female F fitting receptacle the centre conductor plugs into. If moisture has gotten into the female fitting, the LNB operating voltage flowing through the centre conductor wire will have started oxidation. In this process, residue is created and at the very least it will discolour the centre conductor of the cable while in a more severe case white powder will build up around the point where the centre conductor plugs into the female side of the F fitting.

Carefully clean up the fitting, scrape the residue from the centre conductor until the wire is bright and shiny, and put it all back together. This time, take extra steps (such as the Waterlock VS-01 connector cover) to keep moisture out. Intermittent LNB powering and signal dropouts are typical failures when moisture gets into a system; be prepared.

SatFACTS Pacific/Asian Region Orbit Watch: 15 April 1998

Analogue Free-to-Air 57E to 80E

DD1	**55E/2DT** 1330/L
Sun Music	**57E/703** 1395/R
RTNC	1352/R
Gemini	1220/R
AsiaNet	1170/R
WorldNet	1095/R
TVi	1025/R
Muslim	975/L
Tests	**66E/704** 1385/R
Punjab TV	1135/L
Home TV	**68.8/Pas4** Vt/1310
ABN	Hz/1365
BBC W	Vt/1286
Sony TV (Hindi)	Hz/1240
SAT-7	Hz/1218
Doordar.	Vt/1116
CNNI	Hz/1065
TNT/Cart.	Hz/1040
MTV Asia	Hz/965
TVB 8	**76/Ap2R** 1470Vt
ZJTV/ Plus 21	1390/Vt
TVT	**78.5/Th3** 1280/Vt
Army TV	1390/Vt
UTV tests	1500/Hz
RAJ-TV	1510/Vt
LLK/Sony	1630/Hz
TK Rossija	**80/Exprs.** 1475/L
Feeds	1315/L
VTV4+	1275/L
ACT/TB3	1225/L
TV Center	1025/L

Anal. Free-to-Air 80E to 113E

Russia 3	**80/Exprs** 1025/R
RTR 1	**90/S6** 1475/R
Orbita I	1275/R
RTR II	1234/R
Orbita II	1215/R
VTV4	**91.5/Me1** Hz/1440
RTM1	1270/Hz
Metro	**93.5/In2b** 987/Hz
National	1022/Vt
DD9	1080/Hz
DD.7 (T)	1070/Vt
DD.9(K)	1180/Vt
DD.1	1268/Vt
DD.	1310/Vt
DD.4	1388/Vt
ORT 1	**96.5/S14** 1475/R
Madagas-car	1325/R
Tv Azer.	1275/R
ERTU Egypt	**100.4/As2** 1508/Hz
TV Shopping	1490/Vt
Feeds/Iran	1470/Hz
Star News (India)	1410/Vt
Feeds	1290/Vt
WorldNet	1265/Hz
CCTV4	1190/Hz
RTPi	1170/Vt
RTR	**103/S21** 1475/R
Vrk/Apt	1275/R
TPI	**113/C2** 967Vt
CFI/TV5	990/Hz

Anal. Free-to-Air 113E to 148E

Brunei, feeds	**113/C2** 1010/Vt
MTV Asia	1030/Hz
TV Indosiar	1090/Vt
CNBC	1110/Hz
ANteve	1130/Vt
CNNI	1177/Vt
SCTV	1190/Hz
GMA	1240/Hz
TV3	1250/Vt
ATV(7) Australia	1270/Hz
TVRI	1310/Hz
Gujarat +	1350/Hz
RCTI	1408/Vt
Moscow	**122/As-G** 1475/L
Test Card	**128/Jc3** 1070Vt
CETV SD	**134/Ap1A** 1330/Hz
CETV2	1250/Vt
CETV1	1170/Vt
CNNI	**138/Ap1** 1170/Vt
CCTV7	990/Hz
Orbita-I	140/**S7** 1475/R
ORT1	**145/S16** 1475/R
RTR Russia	1275/R
Test Card	**148/Me2** 1070/Hz

Worldstar Radio Sat
Asiastar 1 to 105E (12/98); downlink 1.451-1.492 (GHz). Audio channel capacity: 576 @ 16Kbit/s.

Polarisation?
/L is left hand circular, **/R** is right hand circular, **/Vt** is linear vertical, **/Hz** is linear horizontal.

An. Free-to-Air 150E to 180E

RCTI	**150/C1** 990/Hz
CNNI	**169/Pas2** 1183/Hz
CNN Feeds	1155/Hz (1090 Vt)
NHK	1114/Hz
Feeds	1370/Vt
TV Shopping	1400/Hz
Feeds	**174/I802** 984/R
Feeds	973/R
Feeds (KBS)	**177/I702** 984/R
Feeds	963/R
Feeds	**180/I701** 1340/R
RFO	1309/L
Feeds	1220/R
Feeds	1175/R
Feeds	1090/L
Feeds	1020/L

52

PALAPA C1 150.5E

Tests	990Hz
Tests	1140Hz
Tests	1220Hz
Tests	1330Hz
Tests	1360Hz

Encrypted Analogue

Discov. India	**68.8/Pas4** 1365/Vt
ESPN	1290/Hz
HBO Asia (d) *	**113/C2** 1150/Hz

* scheduled to close . Previously, TNT, ESPN and Discovery have been shut down on this BMAC package.

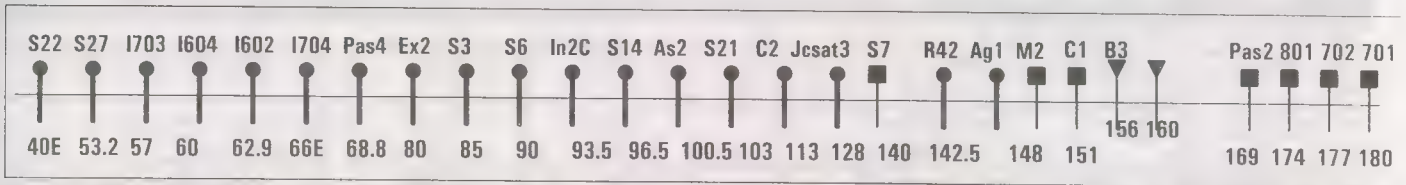
NON MPEG-2 DIGITAL SERVICES

People's Net (GI 1.5)	**113/C2** 1220/ Hz
RPN-9 (SA 1.5)	**142/G2** 1225/L
Fox/ Prime (SA 1.5)	**169/ Pas2/** 1161/Vt
Filipino Channel (GI 1.5)	1314/Hz

(d) B-MAC, access for DTH possible some geographic areas.

April ALERT

Expect erratic operations, possible changes in Optus testing of DTH 16 channel programme package B3, 12.564 and 12.626 during April. Gorizont 24 apparently has moved to 99E, "very" close to As2. Reception reports, notations on possible interference to As2 at 100.5E solicited. PAS-4 NHK digital scheduled 4034/1116 May 1st. Reports C2 Vt signals are stronger at night than daytime - can you verify? Gorizont 140E reported up in level; verifications?



OPTUS B3 156E (Ku only)

ABC WA	1358/Vt B-MAC
Imparja	1355/Vt B-MAC
GWN (Temp OFF)	1300/Vt B-MAC
Net 9, Sky	1233/Vt B-Mac
Austar test (Temp OFF)	1389/Hz Mpeg2
Optus test Mpeg2	1326/Hz
Optus Mpeg test	1264/Hz
BMAC	1230/Hz
School tv	1170/Vt
Galaxy	1137/Hz Irdeto Mpeg 2
Galaxy	1073/Hz Irdeto Mpeg 2
Imparja	1040/Hz B-MAC

Optus A3/152E(a)

ATN7png	1297/Vt
ATN7png	1430/Vt

a/occasional use

Palapa C2 Ku (seen South equator)/113E

Test bars	11.148/Vt

MeaSat 2 148E

Tests	1070/Hz*

* Colour bars . audio 6.8; C-band covers Aust. NZ

OPTUS B1 160E (Ku only)

Data	1402/Hz
QSTV	1377/Hz B-MAC
SE ABC HACBSS	1370/Vt B-MAC
SE SBS HACBSS	1344/Vt B-MAC
NE SBS HACBSS	1339/Hz B-MAC
NE ABC HACBSS	1313/Hz B-MAC
Sky Channel	1296/Vt B-MAC
ABC Radio	1276/Hz (digital)
OmniCast	1270/Vt (FM/FM)
ABC feeds	1247/Hz Pal
Sky Nz (sport)	1245/Vt VidCrypt
Net 9 feeds	1220/Hz B-MAC
Sky Nz (Orange)	1218/Vt VidCrypt
Net 10	1182/Vt E-Pal
Net 9	1180/Hz E-Pal
Net 10 feeds	1155/Vt Pal
QTQ9	1145/Vt
Optus test	1124/Vt
7 Net	1086.Vt E-PAL
Aurora MPEG-2	1076/Hz (tests)
CAA air to ground	1009/Vt Nbfm

PAS-2 169E (C + Ku)

CCTV	1433.5/Vt (Sa9223)
Napa feed	1407/Hz
Value Ch.	1400/Vt
Discovery PowerVu	1374/Hz (Sa9223)
AB Asia, feeds	1335/Vt
ABS/CBN	1314/Hz (GI 1.5)
WCE-TV, feeds	1250/Vt
MPEG-2 PowerVu	1249/Hz (Sa9223)
CNN+ (1/2Tr)	1183/Hz
FoxSports	1160/Vt (SA 1.5)
Feeds	1150/Hz
NHK (digital)	1115/Hz
NHK anal.	1090/Vt
NBC Mux MPEG	1057Vt (Philips)
MPEG-2 PowerVu HonKong	1002/Vt
TCS Sing.	967/Hz

PAS-2 Ku

GWN	12.263V
MediNet	12.286V
Telstra Bendigo	12.300V
Napa TC	12.415V
MTV Asia	12.604V (MPEG)
ABC Interchge	12.629, 638, 646 /Vt
Herblife	12.732H

Intelsat 801 174E

Feeds	963/R
Feeds	984/R

Intelsat 702 177E

Feeds	963/R
AFRTS	973/L (PowVu)
Feeds/ KBS	984/R
Space TV Sys	12.612H (MPEG)

Intelsat 513 177W

Feeds	963/R
Feeds	984/R

(513 Ku)

Service	RF Freq.
US Nets	10.980V
NBC	11.015V
Feeds	10.510V

Ku Services
Intelsat Ku band services shown here are boresighted to Japan and nearby Asia, have not been reported south of equator.

TDRS5 / 174.3W

Fuji TV	1305/Hz
MPEG feeds	1150/Hz

Intelsat 701 180E(W)

TVNZ	955/Dmv 3000
TVNZ	964/Dmv
TVNZ	972/Dmv
TVNZ	980/Dmv
TVNZ	988/Dmv
Occ Vid.	1,020**
TVNZ	1,030
SPN	1,069
Feeds	1,090**
SCPC	1,126
SCPC	1,136
Vidip/(e)	1,220
Feeds	1,254
NHK(e), NBC	1,270
TVNZ	1,293/e
RFOanal	1,309**
Feeds	1,340
10 Oz MCPC	1,385 (PwRvu)
CNN USA(e)	1430

* RHC & LHC
** LHC only
e/ encryption

(701 Ku)

NHK	11.135H
CBS	11.475H
CNN	11.508H

UPCOMING SATELLITE LAUNCHES

ChinaStat 1 to 87.5E (?) now May
JcSAT 6 delayed to July 30th
Sinosat I - "June"
Intelsat 805 now scheduled June 12/13
AsiaSat 3S March 1999 to 105.5E

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 April 1998

Bird	Service	RF/IF & polarity	# Prog channels	FEC	Msym	Interoperable Receivers
I703/57E	Sky News	4187/963RHC 4140/1010RHC	1 1	3/4 3/4	5(.632) 5(.632)	unknown
I704/66E	CFI	4055/1095RHC	4	3/4	27(.500)	N163/17X/2X. HS-100C
	Indian bouquet	4068/1082LHC	2(?)	1/2	7(.100)	HS-100C. e3
PAS4/68.5E	ART/ BBC	3980/1170Hz	2	3/4	5(.632)	e3
	TVSN + TFC+	3743/1407Hz	6	3/4	21(.800)	(MPEG-2, Iredeto) (CA)
	CCTV	3716/1434 Hz	6	3/4	19(.850)	Pv9223, N163/2X, HS-100C
Ap2/76E	AXN	3920/1230Hz	8	7/8	28(.340)	Nokia e3, probably others
Thaicm 3/78.5E	UTV	3920/1230Hz	6TV(#1)	3/4	27(.500)	Mostly CA
	UTV/MCOT	3880/1270Hz	8TV(#2)	3/4	27(.500)	Mostly CA
	Reuters Feeds	3636/1514Hz	1TV	3/4	5(.632)	Nokia e3, probably others
	Unknown	3600/1550Hz	8TV	3/4	26(.662)	Nokia e3, probably others
Measat 1/91.5	India Bouquet	12284/12346Vt	10+TV?	7/8	30(.000)	Philips
As2/100.5E	Chinese tests	12.295Hz 12.329Hz	1TV 1TV (BTV 1)	2/3 1/2	6(.103) 6(.930)	HS100C. e3
As2/100.5E	Laos TV	4143/1007Hz	1TV	2/3	2(889)	HS-100C. N163, e3
	Euro Bouquet	4000/1150Hz	6TV. 1r. (#3)	3/4	28(.125)	ANY DVB receiver
	Hubei TV (HBTV Main)	3854/1296 Hz	2	3/4	4(.418)	HS-100C. N163/17X/2X. N2000. Ph3950/11
	Hunan TV (SRTC)	3847/1303 Hz	1	3/4	4(.418)	HS-100C.N163/17X/2X. N2000. Ph3950/11
	Guandong TV (GDTV)	3840/1310 Hz	1	3/4	4(.418)	HS-100C.N163/17X/2X. N2000. Ph3950/11
	Inner Mongolia TV Zizhiqu	3828/1322 Hz	2	3/4	8(.397) (1-China) (2-Mongolia)	HS-100C. N163/17X/2X. N2000. Ph3950/11
	APTV London	3800/1350 Hz	1	3/4	5(.631)	DMV. HS-100C. N163 /17X/2X
	BBC Radio	3793/1357 Hz	?	?	?	(Comstream ABR200/202)
	WTN Jerusalem/ London	3790/1360 Hz	1	3/4	5(.631)	DMV. HS-100C. N163/17X/ 2X
	WTN London	3786/1364Hz	1	3/4	5(.631)	Mostly CA now
	WTN HK	3775/1375 Hz	1	3/4	5(.631)	DMV. HS-100C. N163/173/2X
	Liaoning TV (Service 2)	3734/1416 Hz	1	3/4	4(.418)	HS-100C. N163/17X/2X. N2000. Ph3950/11
	Jiangxi TV (JX Sat TV)	3727/1423 Hz	1	3/4	4(4.18)	HS-100C. N163/N17X/2X. N2000. Ph3950/11
	Fujian TV (SETV)	3720/1430 Hz	1	3/4	4(.418)	HS-100C. N163/17X/2X. N2000. Ph3950/11
	Quinghai TV Zenghou	3713/1437 Hz	1	3/4	4(.418)	HS-100C. N163/17X/2X. N2000. Ph3950/11
	Henan TV Main	3706/1444 Hz	1	3/4	4(.418)	HS-100C. N163/17X/2X. N2000. Ph3950/11
As2/100.5E	Sky Racing	4020/1135Vt	3TV	1/2	18(.000)	Pace DVS-211 (CA)
	EMTV	4006/1144Vt	1TV, 2 radio	3/4	5(.632)	HS-100C. N163. Pv9234
	Hallmark/KIBC	3940/1210Vt	2TV	2/3	26(.655)	HS-100C (2.05). e3 (V5.0)
	STAR TV	3900/1250Vt	7TV (#4)	7/8	26(.850)	Now all CA (Pace DVS211)
	Hei Long Jiang	3834/1316Vt	1TV	3/4	4(4.18)	HS-100C. e3
	JSTV	3827/1323Vt	1TV	3/4	4(.418)	HS-100C. e3
	AHTV	3820/1330Vt	1TV	3/4	4(.418)	HS-100C. e3
	"QQQ" China (Shaanxi)	3813/1337 Vt	1, 1 Radio	3/4	4(.418)	HS-100C, N163/17X/2X. N2000. Ph3950/11
	Guangxi GXTV	3806/1345Vt	1, 1 Radio	3/4	4(418)	HS-100C. N163/17X/2X. N2000.
	Eastern TV Taiwan	3785/1365 Vt	5TV (#5)	3/4	18(.000)	Pv9223 (CA)

1) Hallmark, 2) KIBC, 3) Gotenet 1, 4) Gotenet 2, 5) Gotenet 3, 6) Multicast

Bird	Service	RF/IF & Polarity	# Prog. channels	FEC	Msym	Interoperable Receivers
(As2/100.5E)	Myawady TV	3766/1384Vt	1TV	7/8	5(.080)	HS-100C (PIDs now 1062/1063)
	Japan Tel (feeds)	3765/1385Hz	1TV	3/4	5(.632)	HS-100C. e3
	STAR TV	3700/1450 Vt	8TV (#6)	3/4	28(.100)	Pace DVS-211 (CA).
C2/113E	Tests	11.500Hz	multiple TV	7/8	26(850)	Pace DVS-211 (CA)
	Star Indovision	3500/1650Hz 3580/1570Hz	20 TV (#7)	7/8	26(.850)	Pace DVS-211 (CA)
	Indovision	3460/1690Hz	6TV	7/8	21(000)	Pace DVS-211 (FTA')
	MegaTV	3780/1370Vt	5TV (#8)	3/4	27(.500)	N2X/DVS-211(CA)
Thaicom I/120E	Thailand terres	4120/1030Vt	6TV	2/3	27(.500)	unknown
AP1A/134E	AXN	4060/1090Vt	8	7/8	28(.340)	unknown
AP1/138E	Reuters	3732/1418Vt	1TV. data	3/4	5(.632)	N163/17X/2X
Palapa C1/150.5	Indovision	4117/1033Hz	10TV	7/8	26(.850)	same as 3580 C2
Optus B3 156E	Galaxy	12 438Hz 12.673Hz	20+TV (#9)	3/4	29(.473)	Gng. P400. P500. Pn520. + Pn630. Sk888 (c)
	Aurora Test	12.469Vt	3+ TV	2/3	30(.000)	e3. HS100C (tests now dormant)
	Optus Vision	12.564 Hz 12.626 Hz	16TV. 8 (#9A)	3/4	29(.473) 29(.445)	(when testing is over. only IRDs with Irdeto CAM)
	Austar/Galaxy	12.689Hz	tests-up to 10TV	3/4	29(.473)	e3. HS100C. P400. P500. PN630
Optus B1 160E	Aurora (MPEG test)	12.377Hz	5+ TV (#10)	2/3	30(.000) [27(.500)]	N163/17X/2X. Pv9223. HS-100C
PAS-2 169E	ABC Interchange	12.646 (.638. .629)Vt	1 TV (each)	3/4	6(.980)	Pv9223. Hs100C. e3
	Telstra Bendigo	12.300Vt	3TV. 2 radio	1/2	10(.138)	Pv9223/9234. (CA)
(Inactive?)	Mediasat	12.286Vt	1TV	3/4	6(.610)	Pv9223. HS100C. e3 (some CA)
	GWN Perth	12.265Vt	2TV. radio	1/2	16(.200)	Pv9223/9234. HS100C. e3 (CA)
	MTV Asia	12.605Hz	8TV	1/2	22(.490)	Unknown- Asia beam only
	Hong Kong PowerVu	4148/1002 Vt	8TV (#12)	2/3	24(.430)	Pv9223. HS-100C(*). N2X* (some FTA)
	NBC Hong Kong	4093/1057 Vt	7TV (#13)	3/4	29(.473)	HS-100C. Gng. N163/17X/2X. P400 (b). P500. Pn520. Pn630. Sk888
	JET Singapore	3962/1188 Vt	2TV (1-Ntsc, 2-Pal)	1/2	13(.740)	Pv9223 (CA)
	ESPN (USA)	3860/1290Vt	4TV. 2 control	7/8	26(.470)	Pv9223 (CA)
	CCTV China PwrVu	3716.57 1433.5 Vt	5TV (#14)	3/4	19(.850)	Pv9223. HS-100C. N163/17X/2X (FTA)
	TCS Singapore	4183/967 Hz	2TV (#15)	1/2	6(.620)	Pv9223. HS-100C N17X/2X (FTA)
	ITJ- J.Telecom	4 174/976 Hz	1 TV	3/4	5(.632)	HS-100C
	AAR-ART/ RAI Int	4153/997 Hz	3TV (#16)	3/4	5(632)	HS-100C. Pv9223 . N17X/2X. (continues FTA)
	Feeds	4138/1012Hz	1TV	3/4	6(.620)	HS-100C. e3
	NHK Joho	4035/1115Hz	3TV	3/4	26(.470)	ICA/D9234: 2-FTA HS-100C +
	PAS-2 feeds	3940/1210 Hz	2TV(NTSC)	2/3	6(.620)	Pv9223. N2X. HS-100C
	California PowerVu	3901/1249Hz	8TV (#17)	3/4	30(.800)	Pv9223. HS-100C (*) N17X/2X (*). (some FTA)
	Disney/Aust	3804/1346Hz	1TV	5/6	21(.093)	Pv9223 (CA)
	Discovery Singapore	3776/1374 Hz	7TV (#18)	3/4	21(.093)	Pv9223. HS100C. N2X (occasionally Ch. 2 FTA)
	Satcom 1-6	3743/1407Hz	6TV	7/8	19(.465)	Pv9223(CA)
	Unknown test	3718/1432 Hz	3TV	2/3	6(.620)	e3
1702/177E	AFRTS	4177/973 LHC	8TV. 12 radio & data (#19)	3/4	28(.000)	Pv9223 (CA)
	SPACE TV Systems	12.612/1312 Hz	13TV.11 radio (#20)	3/4	26(.694)	XTCCDTV200 (All but 1#301 now CA)

Bird	Service	RF/IF & polar	# Prog Chs	FEC	Msym	Interoperable Receivers
I701/180E	TVNZ Gennet (feeds)	4195/955RHC 4186/964 4178/972 4170/980	1TV(CA) (BBC Gennet) 1TV(CA) (APTV/Tokyo+)	3/4	5(.632)	DMV,. HS100C, N17X, 2X, e3 (for non CA channels when active; not all channels active all of the time).
	Americas(radio)	4175/975LHC	3+ radio (?)	2/3	3(.680)	e3. (CA)
	TVNZ CRY	4120/1030RHC	1TV	3/4	5(.632)	(see TVNZ above)
	RFO-Canal +	4095/1055LHC	5TV	3/4	27(.500)	MPEG-2. 2-CA. 3 FTA
	SPN Nauru	4081/1069RHC	1TV	3/4	4(730)	HS-100C e3
	SPACE TV	3922/1228LHC	2TV (FTA)	7/8	21(200)	Unknown - reception not verified
	TVNZTL	3857/1293RHC	MTV Europe	3/4	5(.632)	HS100C e3 (now CA)
	10 Australia	3765/1385RHC	6TV	7/8	29(.900))	Hs100C. e3. Pv9223 (4ch CA)

Bouquets: 1)Thailand UTV: (1) CNN, (2) TTV, (3) ESPN, (4) HBO, (5) Ch. 5, (6) itv; **2)** Thailand UTV/MCOT: (1)MCOT , (2) UTV Sports (3) test, (4) TTV News, (5) test, (6) Live, (7) Channel B, (8) Discovery; **3)** European Bouquet. (1) Deutsche Welle, (2) MCM, (3) RAI International, (4) RTVE, (5) TV5 Paris, (6) [when operating] Deutsche Welle special programme channel with MediaNet VBI included [lines 10-15, requires DMV M2/Pro/Txt board inserted in 3000 series receiver]; Radio (1) DW#1 (stereo), (2) DW#2 (stereo), (3) DW#3 (stereo), (4) YLE (left) & RCI (right), (5) SRI (l) & WRN (r), (6) REE, (7) DW#1 (stereo), (8) DW#2 (stereo), (9) DW#1 (stereo), (10) NN RA6, (11) NN RA8; **4)** STAR TV Hong Kong. (Nowl all CA) ; **5)** Eastern TV Taiwan. (1) "U1" [movies], (2) "U2" [news], (3) "U3" [sport, cartoons, general entertainment], (4) "Rock TV", (5) Rock TV (; **6)** STAR TV Hong Kong. (1) Channel 6, (2) ESPN Contributory, (3) Racing Ch., (4) Star Movies SEA, (5) Star Chinese, (6) NBC, (7) CNBC, (8) Sky News, (9) VIVA Cinema; **7)** Indovision. (1) HBO Asia, (2) STAR Movies SEA, (3) Film Indonesia, (4) MGM Gold, (5) ESPN Asia, (6) STAR Sport, (8) Channel 'V' International, (9) Channel 'V' Asia, (10) RCTI, (11) STAR +, (12) Discovery, (13) STAR Movies and NBC Asia, (14) Phoenix Chinese, (15) CNN, (16) BBC World, (17) CNBC, (18) Cartoon + TNT, (19) Preview 1, (20) Preview 2; **8)** MegaTV (1) CNNI, (2) Discovery, (3) ESPN Asia, (4) HBO Asia, (5) Cartoon + TNT, [(6) MGM Gold, (7) Cinemax (6-7 may not be operating]; **9)** Galaxy. Presently 22 programme channels. **9A)** Optus Vision tests, FTA (temporarily): (1) Sports A, (2) ESPN, (3) Mega, (4) CNN, (5) Odyssey, (6) NHK, (7) Movie III, (8) TVNS or Disney, (9) Horizon, (10) Movie II, (11) Ovation,(12) Movie I, (13) Sky News, (14) Cartoon Net, (15) TNT, (16) Sports AFL; ; **10)** Aurora. (1) SBS NT, (2)SBS NE, (3)SBS, (4) Sky News, (5) ABC WA ;**12)** Hong Kong PowerVu. (1) CTN 1, (2) CTN II, (3) TVBI Hong Kong, other feeds [NTSC], (4) TNT/Cartoons [PAL], (5) **Ad-hoc II** [NTSC], (6) **CNBC**, (7) CTN II, (8) CTN; **13)** NBC Hong Kong. (1) CNBC, (2) CNBC Mandarin A, (3) NBC Asia, (4) colour bars, occasional feeds, (5) CNBC Mandarin B (6) NBC "2" Asia/Taiwan, (7) Colour bars, "future" use; **14)** CCTV China. (1) **CCTV4** , (2) **CCTV3** [(3) **CCTV 9**, (4) **CCTV4**, (5) **CCTV5**, (6) **CCTV8, (7) CCTV tests** ; **15)** TCS Singapore. (1) **TCS Test**, (2) **TCS Default** [repeats channel 1]; **16)** SCPC3. (1) ad-hoc use, (2) AAR/ART, (3) RAI International; **17)** California PowerVu. (1) **CMT**(NTSC), (2) **CBS feeds**, others including CTV Canada (NTSC), (3) ATN Asia TV Network(NTSC), (4) **EWTN** (NTSC) global Catholic radio, ch. 2, (5) **BBC World** (NTSC), (6) **Bloomberg Financial** (NTSC), (7) Golf Channel (NTSC),. **18)** Discovery. (1) Disc. Aust/NZ, (2) **Disc. default**, (3) Disc. Japan, (4) Disc. SE Asia, (5) Disc. Taiwan, (6) Disc. Philippines, (7) Disc. China; **19)** AFRTS. Up to 19 video, audio, data cxhannels; non accessible (PowerVu CA); this is a very dangerous (Bootloader) place for D9223 receivers to be! **20)** SPACE Systems (177E, Ku) claims to be back on the air with 11 CA Taiwan TV programming sources, 11 radio channels plus North American sourced adult channels Erotica and Exxxtasy (all CA), and, (FTA) Thai TV 5 International (loads as Ch 301).

MPEG-2 DVB RECEIVERS: [Data here is believed accurate; we assume no responsibility for errors in this volatile area!]

Benjamin DB-5000. FTA, unknown operational characteristics. Telsat (64-6-356-2749)

DMV/NTL 3000. Skandia Electronics Pty Ltd (tel 61-3-9819-2466)

Grundig (Gng) DTR1100 (badged Panasat 630, believed no longer in production). Av Comm Pty Ltd (tel 61-2 9949-7417)

Hyundai-TV/Com. Model HSS-100C is officially available from Skandia Electronics (tel 61-3-9819-2466), Bay Satellite TV Ltd (tel 64-6-843-5296). Current version of chips 2.26.

Hyundai HSS-100B/G. New January 1998; software version 5.0, see HSS-100C sources.

Hyundai HSS-100 V. 2.26 (with TV/Com tuner). Revised model available SATECH (61 3-9553 3399) and Bay Sat (64 6-843-5296)

MediaStar D7. Supplier preloaded software known channels, V. 2.050 from Opac Pty Ltd. (61-2 9584-1233), Telsat (64 6-356 2749)

Nokia 9500 S (V1.63). This version is no longer available although it has ability to identify Msym and FEC parameters of unknown carriers. (V1.7X) was a German language "d-Box" version originally imported by OPAC; it functioned with the same parameters as the V1.63. (V2.X; 2.233/e3, 2.034 and others perhaps not yet identified) are current (after mid-1997) software versions that allow virtually unlimited stacking of bouquets and programmers and for at least the 2.233 version also allows limited red menu correction of NTSC glitch (see SF#36, p. 6). e3 is current Asia-Pacific factory version. Factory supplied sources known include: AV COMM Pty Ltd (Tel 61-2-9949-7417); SCITEQ (61-8-9306-3738); Telsat (64-6-356-2749). AV-COMM also has macro-command IR remote that expedites 'red menu' operations for e3 version 9500 S. (see SF#36. p. 32); plug-in module for auto red menu NTSC (SF#41, p. 19).

Nokia "d-box" (V1.7X) suitable for C-band use. Instructions, on-screen prompts may be in German. Be careful when buying this one!

PACE DVS-211. Officially available only through Sky (racing) Australia (Bob Pankhurst tel 61-2-9451-0888).

PACE DGT400. Through Galaxy offices, Australia (will not work on FTA if receiver has been over-air software upgraded [parental]).

PACE DVR-500. Bay Satellite TV Ltd. (tel 64-6-843-5296); also supplied by NBC to affiliates.

Panasat 520 (Pn520), **630** (Pn630), **635** no longer available. Limited spares from Antares Satellite (61-7-3205-7574)

UEC 642. A notation - The (642) is scheduled through Nationwide Antennas (61-7-3252-2947) for Aurora project; mid to late May.

PowerVu D9223, 9225, 9234. Scientific-Atlanta (Sydney) Tel 61-2-9452-3388; BaySat (tel 64-6-843-5296), Telsat (64-6-356-2749)

Note: SA D9223 receivers are RISKY to use for enthusiast purposes because of susceptibility to software overwrite during "boot-loading" sequence. Model 9234 is currently distributed in Western Australia for GWN reception under "RTIF" subsidy programme, and for NHK Premium through SA.

SK888. Skandia Electronics Pty Ltd. (tel 61-3-9819-2466)

XTC CDTV200. (For Space TV Systems); only source James Tzeng at (USA/tel) + +1-714-529-9988 or fax + +1-714-529-9989

YURI HSS-100C. Rebadged Hyundai, software 2.27 which is Australian created mod from V2.26. Nationwide (61-7-3252-2947)

WITH THE OBSERVERS

AT PRESS DEADLINE

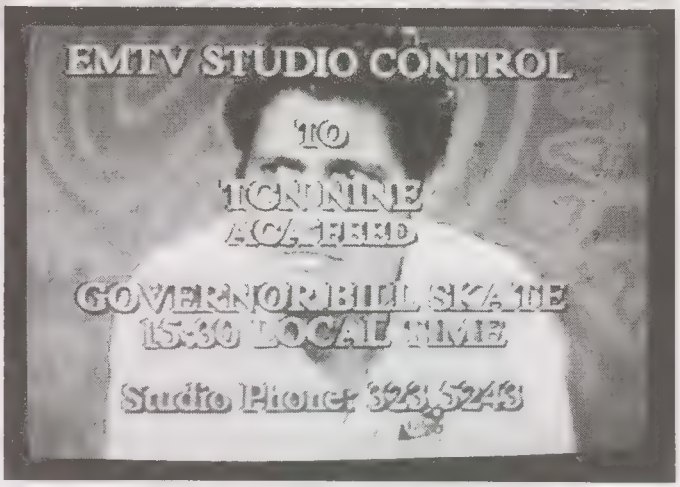
PAS-7 has become PAS-6B and will go to 43W (was to collocate with PAS-4); PAS-9 will replace 7 but at 72E (launch date not announced). JCsat 4 is now at 124E (from 150E); Ku. NHK World newscasts in Japanese at PIDs 1220/1320, in English at 1222/1322. NHK analogue PAS-2 switched to PAL from NTSC.

Our February issue report described plans at Canal + to expand into the Pacific and support a DTH bouquet using MPEG-2 technology. At least the first step of that plan is now operational and while it may not satisfy hard-core Francophiles, it does offer expanded French language programming via Intelsat 180.

The French Canal + pay TV service is one of the more successful DTH services in the world and claims more paying subscribers than even Murdoch's BSkyB service. For more than two years it has been relaying one channel of programming to Tahiti and New Caledonia using MPEG-1 format software and an I180 slice on LHC (left hand circular). It has been little (or not at all) reported simply because (1) the signal level has been significantly lower than most of us could access with a reasonable size dish, and, (2) the MPEG-1 format which simply does not play on an MPEG-2 receiver.

In mid-March testing began using I180, the RFO analogue transponder, after RFO left the air for the night. A small number of observers found it operating and reported the numbers through some of the Internet web sites that specialise in such information. On April 1, the service began formal operation. The numbers are: 4095/1055 LHC on a global beam (I180), Msym 27.500, FEC 3/4. There are four and sometimes five programme channels here. Two are for Canal + (one being for French Polynesia time zone and one for New Caledonia) , plus direct Paris created feeds for RFO-1 and RFO-2; the twin Tahiti channels. The fifth (are you sitting down?) is a Saudi (Arabia) TV network feed which is being carried under contract for a short period of time. RFO-1, RFO-2 and Saudi are FTA and Hyundai or Nokia receivers seem to access it just fine. The Canal + services are intended to go to pay TV terrestrial retransmission sites in French Polynesia and New Caledonia and at this time neither is available for DTH or other uses. Several people are working on resolving this, and we'll keep you advised if there is a break through. The RFO-1 and RFO-2 Paris originated feeds, sent through a relay uplink in British Columbia, Canada, are *not* parallel to what you see on RFO-1 in analogue. The feed times accommodate Paris, programming is taped in Papeete/Noumea and may be delayed as much as ten days before airing on RFO-1 analogue service.

Meanwhile, not directly related, the RFO-1 Global beam analogue channel which has been FTA for ten years now at I180 switched from RHC to LHC and to an eastern zone beam. The net result was instant disappearance of RFO for anyone



Live feeds from Papua New Guinea to Australia during periods of political unrest can be found in the clear in PAL on Optus A3 (inclined orbit, 152E) at 12.597 and/or 12.730.

Below - TV Chile (ident upper right) PowerVu FTA service in California bouquet was scheduled to close down April 15th. If you believe they have a future as a pay-TV service, contact + +56-2-707-7200 to register your sentiments.

west of French Polynesia. As you might imagine, there are thousands of not happy people spread from PNG to Australia to New Zealand to Wallis and Futuna (Islands) who depended

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for May 15th issue: May 4 by mail (use form appearing page 34), or 5PM NZT May 5th if by fax to 64-9-406-1083.

upon RFO-1 for their TV service. The LHC fed service is on 3841/1309 which is a transponder change as well as a polarisation switch. And more change is on the way. On a date not yet certain but possibly as soon as June, this RFO-1 analogue feed is scheduled to switch to (FTA) digital and add RFO-2 to the new bouquet. Within that change is the possibility that a DTH pay TV package will also be involved. The promoters of this in Tahiti "know" what the service would contain *if* it were operational: RFO-1 and RFO-2 in FTA, and four more including movie, sports, news and general entertainment channels in CA. They also claim to know the price ($US60 per month) and the receiver they plan to use (Nokia 9602s imported through France). This caveat: As we warned in February, there are no official announcements from Canal + about any of this and as we are learning, what actually happens may occur with no real notice (example: RFO-1 signed off their old I180 analogue service March 31 with only a 30 second announcement that when they returned the next day, it would be on a new polarisation and frequency!). A Vice President for Canal + French Overseas Territories, at a press conference in Noumea April 3rd, told SatFACTS, "There is *no immediate plan to launch a DTH service in the Pacific. You must understand Canal + is a commercial station and any French satellite platform will have to include government channels* (i.e., RFO-1, RFO-2) *as well as Canal + service. We do not believe there are sufficient people* (in French speaking territories in the Pacific) *to make this commercially viable at this time*." One side effect of RFO leaving RHC analogue: SPN dish installers throughout Pacific have routinely used RFO as a "road sign" to properly locate I180RHC. With RFO gone, next best RHC signal to use is USA feeds on 3930/1220; not as strong, usually encrypted but a "road sign" none the less.

Observer **Peter Nelson** (Vic, Australia) reports frequent reception of PAS-2 "occasional feeds" 4138/1012Hz. He also notes, "changed feedhorn to new ADL and improved performance on Ku is amazing."

Observers reporting strong signals from AsiaSat G (122E) Russian NTV/HTB/TWN6 service (1475 LHC, audio 7.0) include **David Leach** (NSW).

Adult channel "Plus 21" has appeared on ApStar 2R (76E; 3760/1390Vt) from 1630-2030 UTC. Service was analogue, largely FTA March 24th - April 4th, then claimed it would become digital CA with cost of US$650. No details on equipment, analogue promos did list telephone and fax number on screen for ordering IRD (David Leach [NSW], **Jacob Hendriks** [Tasmania] and others).

AsiaSat has new web site address: www.asiasat.com. Latest addition to AsiaSat 2 C-band is Deutsche Telekom AG subsidiary DeTeSat planning voice, data and video links between Moscow and Far Eastern regions of C.I.S.

Steve Jepson (Levin, NZ) reports NHK digital on PAS-2 Hz "is strongest digital signal on this satellite."

Madagascar on Gorizont 27 (96.5E) appears to have cut back schedule to weekends only (3675/1475RHC).

Star TV bouquet on AsiaSat 2 (3900/11250) which previously had some FTA and some CA is now totally conditional access (Msym 26.850, FEC 7/8).

Myawady TV AsiaSat 2 (3766/1384Vt, Msym 5080, FEC 7/8) has increased operating hours significantly.

Increased LHC activity on I180; analogue feeds on 4060/1090 and 4135/1015; SPACE TV on 3922/1228 (MPEG-2, Msym 21.200, FEC 7/8) reported - not verified). Baccarat Game Channel (I180) 4028/1124 RHC (MPEG-2, Msym 3702, FEC 5/6). Japan Telecom feeds 3765/1385 Hz AsiaSat 2 (Msym 5632, FEC 3/4); ITJ and Japan Telecom have merged, occasional feeds PAS-2 4174/976 now joint.

AT Sign-off

Optus at the Cross-roads

Here is the scenario.

Optus is fighting for its corporate life and while not cash starved like Galaxy/Australis, cannot seem to get their minds around a winning combination for cable and satellite. There are many, SatFACTS included, who perceive the Optus cable programming package to be significantly better in consumer appeal than the rival Foxtel or Galaxy packages. Optus testing on B3 of 16 programming channels amply illustrates you get better quality MPEG video when you operate 8 programme channels per transponder than when you try to stuff 11 into each 54 MHz as Galaxy now does. Optus originally believed the way to successful DTH operation was through somehow taking over the "liability" that is today's Galaxy/Australis and turning it into a better run, national coverage, DTH platform.

Alas, Galaxy holds the key to many of the Foxtel programming channels and if Optus owned Galaxy, how might they treat rival Foxtel with the pass through contract rights to movies and sport? Foxtel, already smarting from the deal they made with Galaxy, does not wish to find out.

This leaves Optus with but one option - short of picking up Galaxy during a bankruptcy proceeding. *Create their own DTH service.*

The mere speculation that Optus might use their Aurora platform as a springboard to enter direct to home as a national competitor to Galaxy causes six figure per annum executives on the 21st floor at Optus to duck for cover. There is a paranoia at Optus that believes competitors are lurking in rest rooms hoping to overhear business sensitive tid bits and that elevator shafts are bugged with stealth microphones. *This is nonsense* - Optus business plans leak *out* of the building faster than the ball leaving a Rugby scrum. A good reporter can corner virtually any engineer or systems manager from Austar or Galaxy or Telstra in a Sydney bar on a Friday night and in 30 minutes have enough material to fill a theme notebook. The pay TV *industry* headquartered in Sydney leaks sensitive business information to anyone sober enough to take notes or push "record" on his pocket cassette recorder.

Optus has a golden opportunity to restructure the faltering Australian DTH world. Step one? Come face to face with the cost of subsidising IRDs (and DTH installations) and recognise the one enemy standing naked before us all. People are reluctant to pay $1,500 or $500 for a home DTH system that:

(1) Only receives *one* proprietary pay TV programmer package,

(2) Gives them nothing for their initial capital investment *until* they agree to also pay $50 per month to "turn it on."

A lesson from recent (last decade) history teaches us the one fundamental truth of pay TV: "*People will purchase a DTH system, paying for it up front or on deferred payments, provided they can unpack it, install it, turn it on and instantly receive something* (anything!) *of entertainment value without forking out money every month.*" There is something very consumer unfriendly about paying hundreds of dollars for a system that does nothing until you also agree to contract for a package of monthly payments to top-up the original investment. You can purchase a house or a car this way - and enjoy and use it before you start making monthly payments. TV is not in the same consumer world, and it never will be.

Optus can rise to world class by recognising that Britain's BSkyB made a go of subscription TV by starting off with advertising supported free to air channels and allowing the marketplace to create better and better DTH systems at lower and lower prices. Competition drove up DTH system quality, forced down DTH system pricing. Once homes had DTH, watching their reruns of "*I Love Lucy*" or a news channel, and the family grew accustomed to having the new "satellite thing" around, then and only then was it practical to say to those FTA viewers - "*Hey - for a few dollars a week, you can also have first rate movies, live sports, and current American sitcoms.*"

It worked for BSkyB, it works for hugely successful Canal Plus (over 10,000,000 subscribers). Optus could nicely go into orbit and stomp on Foxtel as well as the Galaxy/Australis package (including their Austar and East Coast clones) by putting together a mixed offering of free to air and pay services. The biggest reason to do this - a brand new marketing tool to slice and dice consumer investment options so that virtually every home could find some level of participation they could afford.

The secret here is no secret at all. If IRD based DTH systems must cost upwards of $1,000 (see p. 6, here), put something on the air in FTA form that makes such an investment attractive. The IRDs are a weighty burden on the shoulders of programmers who feel they are forced to create some method of *giving them away* just to get consumers to agree to having pay TV in the home. Make owning an IRD attractive enough, and consumers will actually come to you asking for one. Now that is a radical departure from the present situation!

Francois Stols, Managing Director of IRD supplier UEC spent ten days in Australia late in March calling on Optus, Austar, Sky Channel and others. Street talk in Sydney says he went back to Durban with tentative orders covering 60,000 UEC 642 IRDs in his briefcase. On April 2nd, he told SatFACTS, "*I can say the expectation is that the first 642 IRDs will be intended for the Australian Aurora RABS market and we anticipate deliveries to commence in June. UEC will be contracting with (Australian) companies ... for technical and product support. Importation and primary distribution of the product for the general market will be through Nationwide Antennas in Brisbane. Other supply ... will be directly to business customers such as Austar and Sky Channel.*"

UEC was one of two firms taking their receivers to Hoopdorf, Holland March 9th for Irdeto compliance certification (SatFACTS March 15; p. 32). Now it appears the hardware decision has been made at Optus, the next step is for the 21st floor to side-step their "corporate security" paranoia and get on with implementing a business plan that shifts the marketing of DTH systems away from a monopoly hardware/total *subsidy* approach to an attractive FTA driven hardware/*competitive* marketplace plan. Foxtel, Galaxy and the Galaxy minions will never know what hit them, taking Optus from a "world follower" to a "world leader" in one year. ***Blow this one Optus and you deserve to die.***

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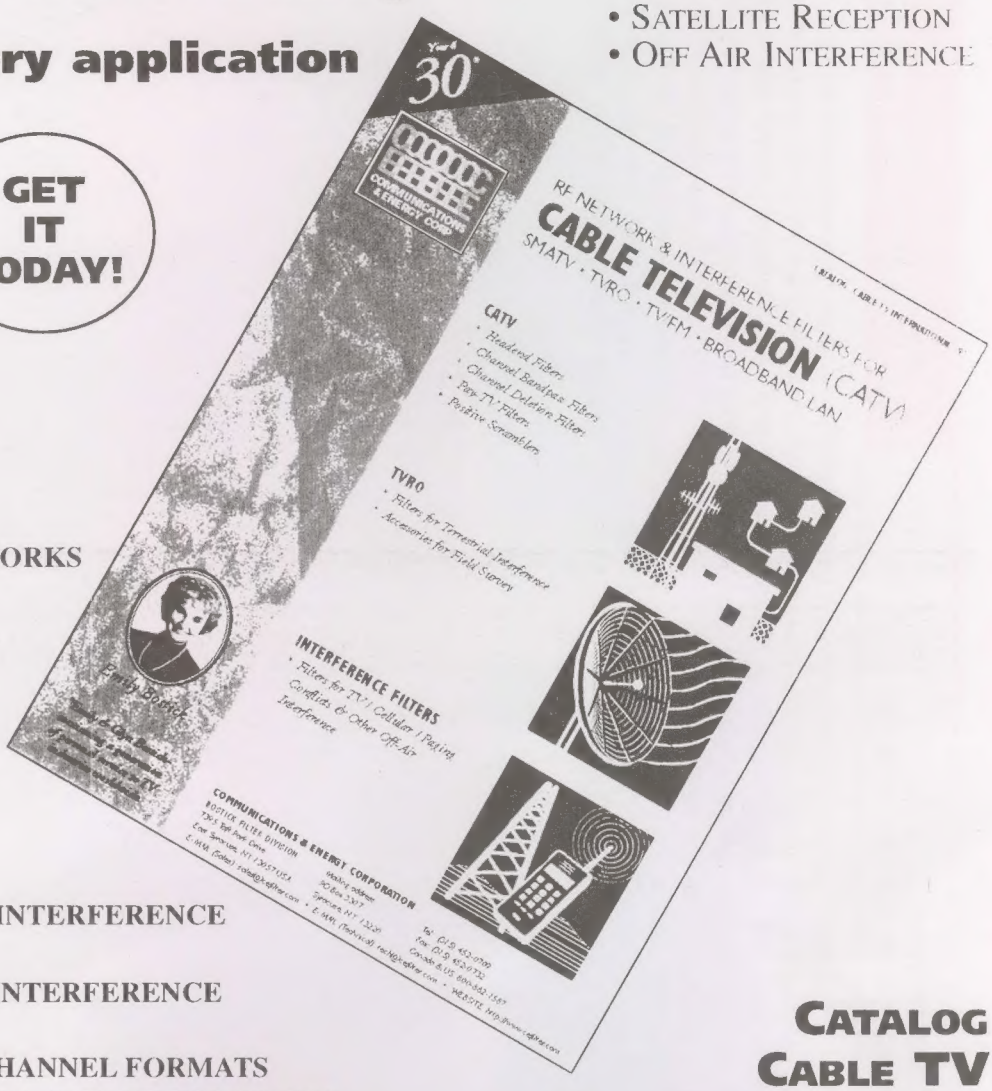

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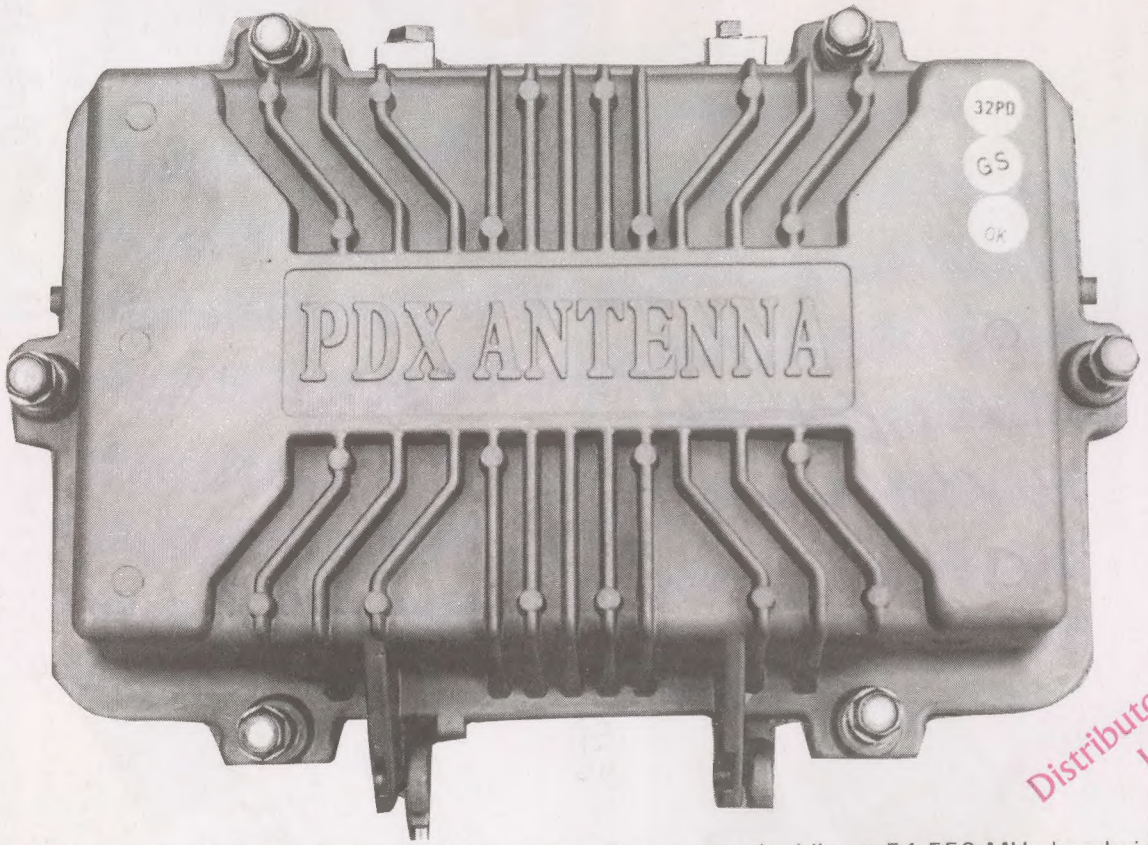

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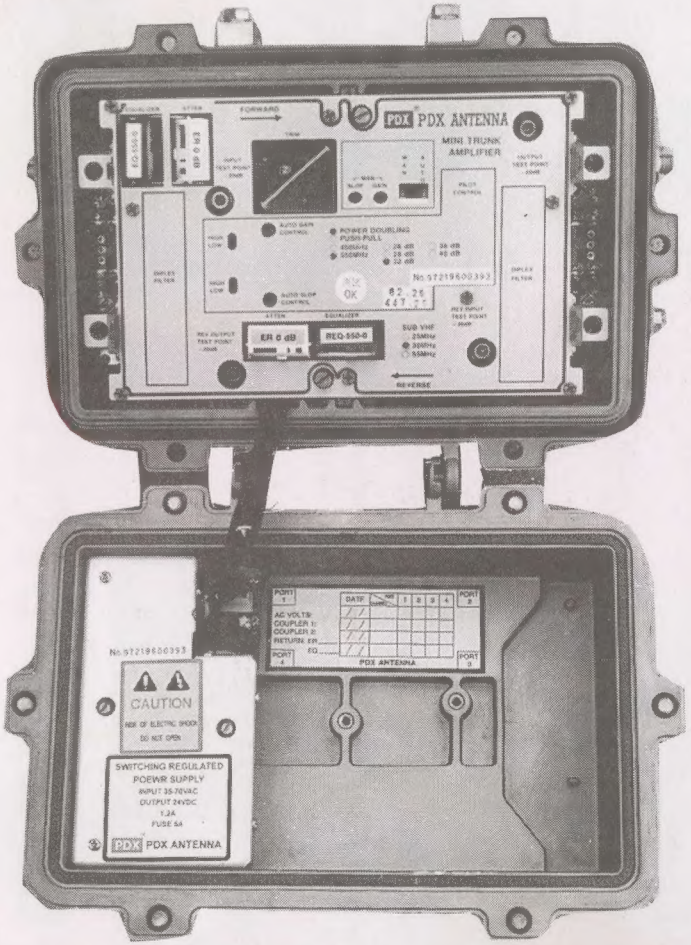

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